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ABSTRACT

This text is an example of a Selected Mathematics Applications (Level A) course, developed for the Hawaii State Department of Education. There are two basic parts to this document. Section one discusses the approach used to develop this course, and provides a brief description of current alternative materials and resources. No materials were found that appropriately interwove problem solving with content area; the documents listed are non-textbook resources that reflect the applications focus of a Level A course. The second part, the bulk of this work, presents an overview of the course and detailed teacher commentary with emphasis on a problem-solving approach to statistics and consumer mathematics. A course outline, a list of seven learner objectives, problem-solving evaluation check list, suggestions for teaching each unit including objectives and comments, student worksheets, quizzes, tests, and answers to these materials are all provided. (MP)

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APPLYING PROBLEM SOLVING TO STATISTICS AND CONSUMER MATHEMATICS

ED197952

SE 033 927

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INTRODUCTION

The Authorized Courses and Code Numbers 1980-1981 lists nine code numbers for Selected Mathematics Applications (Level A) courses. Each semester course utilizes different application areas to address some or all of the Level A Learner Objectives listed in the Mathematics Program Guide.

Applying Problem Solving to Statistics and Consumer Mathematics is one example of a Selected Mathematics Applications (Level A) course. This sample course consists of two parts. Part I discusses the approach used to develop this course and provides a brief description of alternative materials and resources. Part II presents an overview of the course and a detailed teacher commentary with emphasis on a problem-solving approach to statistics and consumer mathematics.

PART I: APPROACH AND ALTERNATIVES

As stated in the Hawaii State Department of Education's Mathematics Program Guide K-12 (MPG), a Level A course is one of two levels of courses offered in Option X. In general, the Option X courses are "designed to assist students in attaining the mathematical proficiency reflected in the essential competencies and the performance expectations." At each level there is a "definite emphasis on basic mathematical skills and concepts in the areas of arithmetic, geometry, measurement and problem solving." The courses are also designed "to maintain and extend (the students') basic skills in these areas through many applications of mathematics in a variety of 'real-life' situations." The MPG lists thirteen Learner Objectives pertaining to mathematical content in four categories for Level A courses.

There are several approaches to designing a Level A course. One possibility is to cover all thirteen objectives in one semester. Since this approach would involve skimming each objective, it would be acceptable for students who primarily just need a quick review. However, students whose basic skills are weak need to spend more time on each one for mastery. Recently published texts for general mathematics classes, with an emphasis on applications, may be adapted for this approach.

Another approach to designing a Level A course is to develop those objectives that apply to a specific career or interest. This has been done in the Industrial and Technical Arts Mathematics courses. High schools that adopted the Pre-Industrial Preparation (PIP) program have developed course guides for these courses. The schools include Waialua, Kalani, and Farrington.

A third approach is to concentrate on applications which emphasize a subset of the objectives. Applying Problem Solving to Statistics and Consumer Mathematics uses this approach. Problem solving is the thread that is woven throughout the entire course. The understanding and analyzing of statistical data and situations from consumer mathematics are dealt with from a problem-solving approach.

This approach reflects the belief that problem solving should be taught in a content area rather than as a separate unit. Unfortunately, appropriate materials in which problem solving was interwoven in a content area could not be located. Moreover, only a limited number of materials that reflected the applications focus of a Level A course were available in non-textbook form. A brief description of these materials is included below. Some of these are student materials; others are teacher resource materials.

STATISTICS:

Lowenstein, D. Graphs and Surveys: How to Prepare and Interpret Them. Columbus, Ohio: Xerox Education Publications, 1973.

Graphs and Surveys: How to Prepare and Interpret Them is an introduction to the preparation and interpretation of graphs and surveys. It begins with an explanation of the four main types of graphs (bar, pictograph, line, and pie). Students are then involved in conducting surveys to

collect their data, organizing this data into graphs, and interpreting the results. The booklet also includes discussion and exercises related to understanding public opinion polls, the misuses of graphs and statistics, and the use of graphs to predict the future.

Graphs and Surveys is a 48-page, consumable workbook. It is listed under "General Social Studies and Skills" in the Xerox 1977 Secondary School catalog for $.55. Since the readings and activities focus on understanding how to prepare and interpret graphs, Graphs and Surveys is appropriate for a Level A statistics unit.

Mathematics Resource Project. Statistics and Information Organization (Preliminary Edition). Palo Alto, CA: Creative Publications, 1977.

Statistics and Information Organization, part of the Mathematics Resource Project, is one of five teacher resource books developed by the University of Oregon. It includes a teacher commentary as well as classroom materials. The teacher commentary provides readings on the rationale for teaching the topic, ways to involve students, and alternate ways to introduce or develop topics. The classroom materials include masters for worksheets and transparencies, lab cards and activities, games, bulletin board suggestions, and teacher-directed activities.

There are a number of appropriate readings for the teacher and suggestions for classroom activities. While the materials are geared for grades five to nine, many of the activities may be used in a Level A unit in statistics.

National Council of Teachers of Mathematics. Booklet 16: Collecting, Organizing, and Interpreting Data in Topics in Mathematics Series. Washington, D.C.: National Council of Teachers of Mathematics, 1969.

Collecting, Organizing, and Interpreting Data is a teacher resource providing a discussion of key concepts in statistics. This booklet may also be found in the Thirtieth Yearbook of the National Council of Teachers of Mathematics.

The booklet addresses the role and application of statistical methods in the analysis of problem situations in which decisions must be made with limited information. Examples and exercises that reflect the many applications of statistics are provided. In addition, a section relating the four stages generally associated with problem solving to statistical procedures is included (see Mathematics Program Guide, pages 16-17).

Forthcoming: 1981 National Council of Teachers of Mathematics Yearbook on statistics and the teaching of statistics.

Articles will provide strategies for teaching statistics as well as exercises for students. Additional references will be included.

CONSUMER MATHEMATICS:

Consumer Education Project. Honolulu: Hawaii State Department of Education.

The Consumer Education Project has developed teacher and student materials for the consumer in Hawaii. The Co-Directors are Barbara D. Nakagawa and Elaine Takenaka of the Department of Education. James J. Harpstrite of the Curriculum Research and Development Group, University of Hawaii, is the Principal Investigator. Four of the units that relate to food purchases and day-to-day expenses are described below.

Comparisons, Comparisons is a booklet covering unit pricing and comparison shopping. Students collect price information from supermarkets and small neighborhood stores. This information is tabulated and compared using a five-step procedure. Background information and leading questions that should help students summarize their data are included.

Hawaiian Balancing Act is a narrative by a 22-year old girl who has decided to live on her own. The unit covers budgeting for rent, balancing a checking account, automobile purchase and insurance, and income taxes. The booklet incorporates actual forms and copies of related documents (Hawaii's Residential Landlord-Tenant Code: Some Questions and Answers and Instructions for Preparing Short Form 1040A).

Shopping consists of four lessons on grocery shopping, open dating, and unit pricing. A detailed sequence of procedures, masters for student worksheets, and a list of items needed are provided for each lesson. Also included are suggestions for additional activities and consumer tips on reading the information on food labels.

Supermarket Special focuses on merchandising techniques used by supermarkets to influence the consumer to buy. The unit categorizes the techniques under four areas: locale and layout, display, atmosphere, and pricing. While this 11-day unit does not involve much computation, it provides students with an awareness of the factors that influence people to buy. It also provides familiarity with the vocabulary related to consumer purchases in the supermarket.

Johnson, et al. Earning and Spending. Glenview, Illinois: Scott Foresman, 1974.

Earning and Spending is one unit of Applications in Mathematics, Course B. The first six topics in this booklet cover ways of computing earnings, deductions, and savings accounts. The remaining topics deal with consumer purchases including purchases at the supermarket, sales and discounts, car expenses, and installment buying. The computational skills required to solve these problems are emphasized in Earning and Spending.

The Lesson Notes section in the teacher's edition provides suggestions for relating the topics to local situations. This section also includes suggestions for extensions using forms and publications provided by government agencies.

Jones, W. L. Mathematics for Today, Level Green. Los Angeles: Sadlier-Oxford, 1979.

Mathematics for Today, Level Green may be used as a workbook or a soft-cover text. Its content is similar to more recent general mathematics textbooks by relating computations to mathematics in everyday life and including features on careers (licensed practical nurse, cashier, energy consultant, etc.) and on solving word problems (choose the operation, estimating answers). Topics covered include mathematics and health, food shopping, department store mathematics, and home improvement mathematics.

Spitler, G., & Allen, C. E. Consumer Mathematics (CM 1, 2, 3, 4). San Francisco: Rand McNally, 1977.

These consumer mathematics booklets, CM 1 to CM 4, are four of forty modules in Rand McNally's Mathematics in Modules (MIM) series for junior and senior high schools.

The four CM modules may be used for a Consumer Mathematics course or studied as independent units. All modules apply mathematics skills to real-life situations. CM 1 covers food purchases and day-to-day expenses. Major expenditures for cars, furniture, and family vacations are dealt with in CM 2. CM 3 covers expenditures for the home including utilities and appliances. Job-oriented concerns related to payroll deductions, taxes, and checking and savings accounts are dealt with in CM 4.

In addition special sections that provide additional review problems and suggestions for applications to local consumer concerns are included in all four modules.

Usher, M. A., & Bormuth, R. Experiencing Life through Mathematics, Volume I. Boulder, Colorado: Pawnee, 1975.

Experiencing Life through Mathematics, Volume I is a workbook approach to the mathematics involved in everyday situations. It contains 24 mini-units (some only 3 or 4 pages long) on topics such as buying a car, planning a vacation, budgeting a family income, applications to athletics, and owning a store. The units need not be taught in sequence.

The teacher's edition suggests that local forms and local figures be used in place of those provided in the text to make the units more relevant.

PART II: APPLYING PROBLEM SOLVING TO STATISTICS AND CONSUMER MATHEMATICS--A SAMPLE COURSE

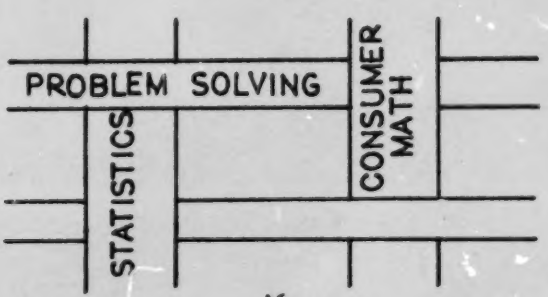
As the title suggests, Applying Problem Solving to Statistics and Consumer Mathematics focuses on the application of problem-solving strategies to the study of statistics and consumer mathematics. Consequently, emphasis and time is provided for the teaching of problem-solving skills and their application to topics in statistics and consumer mathematics. Therefore, this course really has three components: the statistics unit, the consumer mathematics unit, and a third "unit" on problem solving that is interwoven throughout the course.

The focus on problem solving reflects the Department of Education's emphasis on developing these skills. Providing experiences that enable students to develop problem-solving skills is a goal stated in both the Foundation Program Objectives and the Mathematics Program Guide (MPG). A discussion of the role of problem solving in the mathematics curriculum is found in the MPG on pages 15-23.

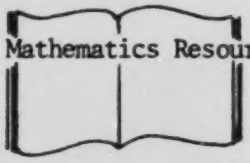
In addition to the goals for developing problem-solving skills, this course includes the following Learner Objectives listed in the MPG for a Level A course:

1. Adds, subtracts, multiplies and divides whole numbers, fractions, and decimals. (Statistics, Consumer Mathematics)
2. Solves simple equations in one unknown. (Consumer Mathematics)
3. Estimates and rounds off as needed. (Statistics, Consumer Mathematics)
4. Understands and uses the relationship between fractions and decimal fractions. (Statistics)
5. Organizes and analyzes data by constructing simple graphs or tables about familiar situations. (Statistics, Consumer Mathematics)
6. Reads and interprets charts, maps, and graphs. (Statistics)
7. Collects and classifies selected data, draws valid conclusions to make decisions. (Statistics, Consumer Mathematics)

The sketch below illustrates the components of Applying Problem Solving to Statistics and Consumer Mathematics:



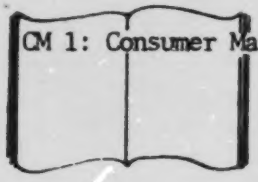
The following form the basis of the statistics unit:



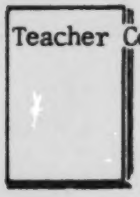
Mathematics Resource Project: Statistics and Information Organization published by Creative Publications ($29.50)

Teacher Commentary and classroom materials prepared by Title IV-C staff

The consumer mathematics unit is based on:



CM 1: Consumer Mathematics published by Rand McNally ($1.80)



Teacher Commentary and classroom materials prepared by Title IV-C staff

Course Outline*

I. Statistics

- A. What is Statistics?
- B. Collecting and Organizing Data
- C. Interpreting Data from a Table
- D. Graphing Data
- E. The Use and Misuse of Statistics in the News

II. Consumer Mathematics

- A. Food Purchases
- B. Day-to-Day Expenses

*Problem-solving strategies are incorporated throughout this course. Applications of these strategies to specific topics are highlighted in the teacher commentary

Problem-Solving Component

The development of problem-solving skills is one of the eight Foundation Program Objectives adopted by the Department of Education. As such, it must be considered one of the "basic skills" that each student should develop.

Problem solving in this context refers to finding an appropriate response to a new situation or to a question which does not have an obvious answer; that is, getting the answer involves more than an act of simple memory or the application of a familiar algorithm. The problem solver must analyze the situation and determine the best strategy among a choice of many.

Problem-solving skills do not necessarily result incidentally from exposure. Rather, these strategies should be taught for maximum results. The attitude of the teacher toward problem solving is an important factor. Some teaching suggestions for problem solving are:

1) To encourage discussion of problems and alternatives. This is the key to the course. Every problem can be expanded if students indicate an interest.

2) To ask leading questions instead of giving answers. What would happen if...? Suppose we change...?

3) To emphasize and provide the time needed for thinking about the problem. True problem solving requires time to think. If the "answer" is obvious, then there was no problem.

4) To emphasize the process or strategies involved. In this course, the goal is to think through a problem. Finding a solution to the problem is just one result of this thought process. These problem-solving techniques are applicable in many areas.

5) To find problem solving a fun, challenging and rewarding experience for yourself and your students.

Teacher directed discussion is an important aspect of this course. Discussion gives students the opportunity to develop language and communication skills. For example, vocabulary can be expanded when unfamiliar words are defined. Also, teachers gain insights into how a student thinks when the student describes strategies used or patterns observed in a problem.

Specific activities and suggestions for highlighting problem-solving strategies are provided for each lesson in the commentary under Problem-Solving Emphases. In addition, specific problem-solving behaviors are included between the double arrows, ≪.....≫, in the left margin.

In addition, an evaluation form, Problem Solving Evaluation Check List, is included on page A9 to help the teacher assess student progress in problem solving. While the assessment is somewhat subjective, it should help to record student progress through the course.

Problem Solving Evaluation Check List*
High School

Course in which Evaluation Occurs: _____

Date of Evaluation: _____

1. Most students are capable of working problems at about what level?

2. Evaluate students' enjoyment of problem solving as good, fair, or poor.

3. Evaluate students' perseverance in problem solving as good, fair, or poor.

4. Have you seen students spontaneously use these problem-solving techniques?

   a. Reads the problem carefully; makes an effort to understand problem

   b. Looks for patterns

   c. Organizes, makes a table

   d. Simplifies the problem or works on part of the problem

   e. Writes a mathematical sentence

   f. Guesses, checks, tries new approaches when stuck

   g. Recognizes absurd or illogical answers

   h. Draws a diagram

   i. Acts out the problem

   j. Extends the problem

5. Other problem-solving behaviors observed.**

* Adapted from Mathematics Instruction in the Elementary Grades, by McKillip, W. D., et al.

** See Mathematics Program Guide, pp. 16-17.

UNIT I - STATISTICS

DESCRIPTION OF STATISTICS UNIT

Statistics may be defined as a branch of mathematics dealing with the collection, analysis, interpretation and presentation of data. Knowledge of statistics and statistical methods is becoming more and more important in today's society. It is necessary to properly evaluate everyday matters like advertisements, public-opinion polls, and business and government "statistics." The ability to think critically and make intelligent decisions when faced with someone else's data interpretation is essential. One objective of this unit is to develop competencies in these areas which will extend beyond the classroom and into the students' everyday lives. This objective corresponds to the broad goals of the mathematics program (see page 13, Mathematics Program Guide), especially:

> Develop mathematical competence to function effectively in today's society.
>
> Develop ability to think critically and solve problems.

Mathematics Resource Project: Statistics and Information Organization, distributed by Creative Publications, is a resource unit which provides background materials and classroom ideas for use with the students. It consists of the following components: Content for Teachers, Didactics, Teaching Emphases, Classroom Materials, Glossary, Annotated Bibliography, and Selected Answers. Worksheets from this resource and materials prepared by the Title IV-C staff form the basis for the statistics unit in this course. Major topics in this unit include Collecting and Organizing Data, Interpreting Data from a Table, Graphing Data and the Use (and Misuse) of Statistics in Advertising. The unit outline is attached. By completing the activities provided students should become aware that statistics is not an exact science.

The study of statistics should incorporate the ideas of problem solving. Before attempting to solve a problem, students should first understand it. Can they restate the problem? Do they understand the vocabulary, conditions or limits of the problem? How accurate an answer is desired? When the students devise a plan they need to consider alternatives and look at their consequences. They also need to determine what information is needed and what method should be used to gather the data. Only then should students carry out their plan (e.g., collect data, organize it into tables or graphs, summarize and interpret results and so on). The last step is very important, yet it's one that too many students ignore. Look back at the work that has been completed. Was the plan a good one? Is the interpretation justified? Is the result reasonable? Has the problem been solved? Are there trends or patterns? Can the information be used for forecasting?

Intertwined with problem solving is the ability to think critically and to make decisions. Critical thinking is essential in solving problems. Many times a decision must be made after a problem has been solved. And often, critical thinking is involved in making this decision.

The study of statistics provides a natural link between mathematics and the physical and social sciences. It can help students to think critically

about statements made in advertisements and daily conversations. Also, it can help students to realize that even though decisions must often be made when all the facts are not known, a wiser decision can be made if the situation is first analyzed using statistical methods.

Outline for Statistics Unit

I. What is Statistics?
   A. Definition
   B. Who uses statistics?
   C. What is statistics used for?
   D. When are statistics used?
   E. Where is statistics seen around us?
   F. Are statistics necessary?

II. Collecting Data
   A. Identifying the problem to be solved
   B. What data should be collected?
   C. Is the question biased?
   D. What method of collection should be used?
      1. Observation
      2. Counting
      3. Questionnaire
      4. Book research

III. Organizing Data
   A. Organizing data smallest to largest
   B. Should data be grouped?
   C. Making frequency tables
      1. Tallying data
      2. Recording frequency

IV. Interpreting Data from a Table
   A. Reading and understanding data
   B. Answer questions about information in the table
   C. Determining whether data may be biased
   D. Observing and analyzing number patterns or break in patterns of data

V. Graphing Data*
   A. Comparing information in paragraph, table, and graph form
   B. Pictographs
   C. Bar graphs
   D. Line graphs
   E. Circle graphs
   F. Multiple data sets on one graph
   G. Determining which type of graph is best suited to data

VI. The Use (or Misuse) of Statistics in Advertising

*The use and misuse of graphs will be incorporated into each pertinent area.

SUGGESTIONS FOR TEACHING STATISTICS UNIT

An outline of materials, objectives, and comments for teaching this unit is provided below. The teacher is encouraged to keep a commentary of the daily lessons on the space provided next to the outline. Notes about classroom management, how to extend the lesson, adequacy of materials and so on can be included. The worksheets from the Mathematics Resource Project have additional comments and suggestions on them in non-reproducible blue ink.

This unit is primarily worksheet and activity oriented. DISCUSSION is essential throughout the unit. Polya's four steps to problem solving and problem solving strategies (see page 13, Mathematics Program Guide) can be emphasized in the discussions. Some of these strategies are highlighted in the left margin between the double arrows, ≪...≫.

Students may need to review some computational skills before completing specific worksheets. Skills necessary are noted in the teacher's commentary for these lessons.

NOTE: The following table outlines the location of the various components.

Page Number	Description
1, 2, 3,...	Mathematics Resource Project: Statistics and Information Organization
A10 - A32	Teacher Commentary
A60 - A90	Masters for Worksheets and Transparencies
A117 - A125	Quizzes and Tests

A. Introduction: What is Statistics

Objectives: To provide familiarization with uses of statistics in the media.
To look at examples of the role of statistics in our everyday lives.

Materials: Copies of newspapers and magazines

Comments: The teacher should read pages 15-18 in Mathematics Resource Project: Statistics and Information Organization. Have examples of references to statistical ideas and statements on transparencies for class discussion. A sample is provided below. Discussion can include the widespread use of statistics (e.g., ads, sports data,

B-4 Honolulu Star-Bulletin Monday, June 11, 1979

Get Ready to Stand Up and Be Counted

WASHINGTON—If you live in a small town, they're interested.

If you ride with a friend to work, they're interested.

But if you insulated your home last year, they don't care.

And if you're homosexual, that's your business.

The Census Bureau has been counting noses in the United States every 10 years since 1790 and next April an army of 275,000 people will do it again.

But the decennial census is far more important than just a nose count. In fact, the Census Bureau has a pretty good idea already of how many people live in the United States—222 million.

It is far more interested in where we live, how we earn our living, how frequently we've moved and who we are.

To gather this data, it has been holding practice censuses for the last 10 years. And it is prepared to spend $1 billion next year—$4 for every man, woman and child—to complete the job, four times what it spent in 1970.

A lot is at stake.

Uses of data

FEDERAL AGENCIES use Census Bureau data for everything from energy planning to deciding what areas need public housing.

The 1980 census is expected to be proof-positive of the importance of America's minority populations and the growing importance of women as bread winners.

And Congress will gather the census material for distribution to the state legislatures so they may accordingly reapportion the 435 House seats in time for the 1982 elections.

Ways of collecting data

And, to keep the workload manageable, it will do a detailed count of only 22 percent of us—with a 65-question long form—leaving the rest to fill out a 22-question short form. For those who fail to mail their forms (postage-free) to the Census Bureau's local offices by April 1, 1980, there will be follow-up phone calls and visits by census takers. It is against the law to refuse to participate in the census, although many people protest that questions on the census forms invade their privacy.

Uses of data

THE CENSUS Bureau was criticized for undercounting minorities in the 1970 count, particularly after big-city mayors and ethnic minority leaders discovered how important the count was to receive federal funds with the start of revenue sharing by the Nixon administration.

Uses of data

Marshall Turner, assistant chief of the decennial census division, freely admits the undercount, but defends the Census Bureau as among the most accurate in the world.

What does this mean?

"In 1970, we missed 2.5 percent of the over-all population," he said, either because the census takers miss houses or because people won't answer the census. Many persons fear the census material will be given to other government agencies, like the FBI or social service agencies, despite denials by the Census Bureau.

One sensitive minority issue will be skirted next year by allowing individuals to determine for themselves if they are a member of a minority. This is particularly critical for Hispanics, who not only go by different names in various sections of the country, but vary as to whether they wish to be counted as Hispanics. Accordingly, the 1980 forms will leave the question to their discretion, as it will be Asian-Americans, Indians, blacks and other minorities.

How accurate is data?

TO TRY TO correct the 1970 undercount and test new questions, the Bureau has run a 1980 pre-census in five cities: Austin, Tex.; Camden, N.J.; Oakland, Calif.; New York City (Manhattan); and Richmond, Va.

Oakland, a predominantly black city, was tested two years ago, and spot checks of housing units—its biggest concern—showed a high degree of accuracy, according to Alex Zuckerman, a city planner.

"They're always going to have some problems because there's a lack of trust in government and people won't answer," he said. "But we feel it went well."

The Census Bureau is pressured by a variety of special interest groups and federal agencies to include questions of interest to them. Most get turned down.

For instance: Homosexual civil rights groups wanted a "sexual preference" question on this year's form, but the Bureau decided the question would offend too many people to include. "We're trying to encourage people to answer, not turn them away," Turner said.

economic forecasts), definitions by examples of statistical vocabulary, and the reading of tables and graphs found in newspapers and magazines. Students can then look for examples in newspapers and magazines.

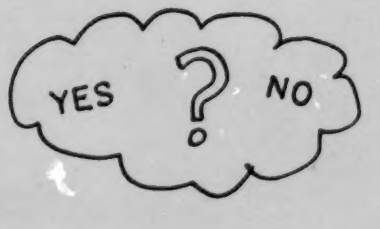
B. A Traffic Problem, page 398 (make transparency)

Objectives: To determine what data is pertinent to a situation.
To decide what data should be collected.

Comments: Before beginning this unit the teacher should read pages 388-395 of the Mathematics Resource Project.

≪UNDERSTANDING THE PROBLEM≫

The first stage of problem solving is Understanding the Problem. The discussion of "A Traffic Problem" is based on understanding the situation so that a decision on what data needs to be collected can be made. A problem is not always simple and to the point. There are many outside factors that influence decisions (see page 19 of Mathematics Resource Project).



After completing "A Traffic Problem" ask the following hypothetical question: Should (your) High School hire (fill in popular group) to play at the next school dance? Have the students determine what facts will influence the final decision.

C. That's A Good Question, page 401
Fact or Opinion, page 402
What's your Bias, page 414 (make transparency)

Objectives: To ask questions that do not bias or influence a person.
To recognize the difference between fact or opinion.

Comments: Discuss methods of gathering data: interview, questionnaire, observation, mail, telephone, in person. Some of the concerns and problems with these methods are given on pages 21-22 and pages 404-405 of the Mathematics Resource Project. Have the students give examples of when each method would be appropriate.

≪IDENTIFY KEY ELEMENTS≫

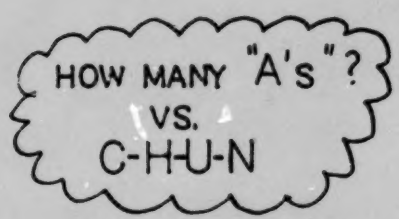
Using the transparency of page 414, discuss the possible biases of each source given. Determine other sources of information for each problem and discuss any biases they may have.

D. Letter Tally, page A60 (make transparency)
Alphabet Numbers, page A61
Cryptic Code, page A62

Objectives: To gather data.
To organize data in tables.
To determine frequencies of data.
To create frequency tables.

Comments: Ask the students which letter of the alphabet occurs most often in all of the students' last names. Have them decide on a method for gathering and organizing the information. The idea of a frequency table should evolve and the Letter Tally transparency can be introduced.

≪APPLY PROCESS USED TO SOLVE SIMILAR PROBLEMS≫



Be sure to compare the following methods of gathering the data:

1) How many A's altogether? B's? etc. and counting.

2) Tallying data for one name at a time (e.g., C-H-U-N, Chun; next name M-A-S-U-I; and so on).

Students often think that method one is faster and, therefore, better. However, it provides many more opportunities for errors and often ends up taking longer. Its use should strongly be discouraged.

≪ORGANIZE DATA INTO TABLES≫

Other frequency tables that can be created in class:

1) The number of coins in students' pockets

2) The size of students' families

3) The number of letters in students' names

Compare the results of Alphabet Numbers with those obtained in the class survey.

≪ANALYZE AND STUDY TABLES≫

Is the most frequently occurring letter in students' last names the same as the most frequently occurring letter in the given paragraph? Is there a good reason for this correspondence (or lack of correspondence)?

The Cryptic Code sheet is ideal for using problem solving strategies! Some hints are given (#1-5), but students will need additional strategies of their own.

E. How Much Are You Worth, page A63 (make transparency)
Value Tally, page A64 (make transparency)
Weighty Numbers, page A65

Objectives: To make a frequency table.
To understand intervals.

Comments: How Much Are You Worth and Value Tally are discussed on page 429 of the Mathematics Resource Project.

≪ORGANIZE DATA INTO A TABLE≫

Discussion on how to organize the data for this activity is extremely important. The ideas of listing from smallest to largest and grouping the data in intervals should be emphasized. Students should understand that intervals must be equal in size and all numbers should be represented.

≪CHECK EACH STEP≫

Discuss problems that would be encountered with the following intervals: 80-90, 90-100, 100-110,.... (How do you tally a value of 90? 100?

On Weighty Numbers be sure that students understand that the total of the frequency column should equal the number of data items in the problem.

F. Rounding, page A66
Round Up, Round Down, pages 410-411

Objectives: To review rounding of numbers.
To understand when rounding is appropriate.
To determine where to round (to which place).

Comments: Many figures used in statistical tables and charts are rounded. Use the exercises on page 411 to begin a discussion on when

it is appropriate to round numbers. Have the students bring in newspaper articles, tables, or charts in which the numbers have been rounded. Discuss whether or not the rounding in the articles was appropriate.

≪DETERMINE NATURE OF ANSWER≫

G. Table 49, page A67 (make transparency)
Table 229, page A68 (make transparency)
Studying Some Sports, page 426

Objectives: To read and understand a table.
To interpret a table.

Comments: Tables are frequently used to organize and display data. However, reading a table is not like reading a book of fiction. It is important to UNDERSTAND how the table is organized, what each number, row, and column represents. Before any analysis or interpretation can take place, one must be able to read the table and get some meaning from what is read. This is again the first stage of problem solving.

≪READ A TABLE≫

≪STUDY A TABLE≫

Following are typical questions that could be used when discussing Table 49:

--What information does this table provide?
--What is a fiscal year?
--Which fiscal year does the table cover?
--What does the number 332.37 mean?
--How many days of school were there in fiscal year 1971-72?
--During which fiscal year was the largest capital outlay?
--What trend do you see in the average annual salary for teachers?
--How much more was the cost per pupil in 1972-73 than in 1973-74?
--What is the source of this data? Is this a reliable source?

≪LOOK FOR PATTERNS IN DATA≫

≪APPLY PROCESS USED TO SIMILAR PROBLEM≫

Similar questions should be used when discussing Table 229. Be sure to note that gross postal receipts are in $1000's (i.e., gross postal receipts for 1970 were $20,840,000) and pieces of mail handled is in millions. Do the students think these figures are rounded? Why or why not? Do they notice any trends? Why are the subscripts used?

H. Table 54, page A69 (make transparency)
Weather and Water Conditions, page 425

Objectives: To read and understand a table.
To interpret a table.
To understand the relationship between numbers on a table.
To realize that numbers should not be blindly interpreted.

Comments: Discuss Table 54 in the same manner as Tables 49 and 229 (see G. above). The students should see that certain columns are related (i.e., the sum of males and females = total, 25 and over = sum of different age groups).

≪STUDY TABLES≫

Two of the data elements were omitted from Table 54. Once the students understand the table, they should devise a plan to find the missing numbers (i.e., use the column relationships). Then carry out the plan and find the missing information. Look back. Does the answer make sense? Is there another way to solve the problem and check the answer? (Yes, the sum of males at each level should equal the figure given for all levels, 230, 313.)

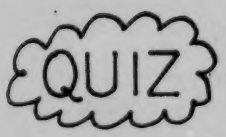
≪LOOK FOR PATTERNS IN DATA≫

On page 425 make sure that students understand that totals are broken down into five different categories and that each category has the same total.

I. Let's Pool the Data, page 430

Objective: To make a table.

Comments: The completed table should have a title and the rows and columns should have headings. Students should notice that the data is both easier to read and easier to interpret in this form.



Quiz 1 should be given at this time. It is found on pages A117-A118.

J. Pineapple Pictograph, page A70 (make transparency)
Forest Fires are a Real Burn, page 451
I Didn't Plant It That Way, pages 510-511

Objectives: To read a pictograph.
To make a pictograph.

Comments: Ask questions about the pineapple pictograph so that students become familiar with the features of the graph: title, symbols, key, and so on. Have the students make a second version of this graph with = 2 truckloads. Emphasize that the key is a mandatory feature of pictographs, and that pictures should all be the same size on any given graph. This will be demonstrated on pages 510-511.

≪CLARIFY MEANING≫

Have the whole class create a pictograph or have small groups work on different pictographs. Possible topics include: 1) number of students with birthdays each month, 2) size of students' families, 3) total number of pennies, nickels, dimes and so on that students in class have, and 4) population of different towns or islands in Hawaii. This activity uses all 4 stages of problem solving (understanding the problem, devising a plan, carrying out the plan, and looking back) and incorporates many of the ideas presented thus far in this unit. Students not only must collect data, they must organize it and determine a reasonable way of presenting it. Finished products can be displayed on bulletin boards.

K. Mouth Control, page 466
Completing Scales, page 462
Scale and Plot, page 463
How Remarkable, page 464
Matching Scales, page 465

Objectives: To read scales.
To complete scales.
To label scales and plot points.
To mark equal intervals on scales.
To match data to appropriate scales.

Comments: Explain that numerical scales are used on bar graphs and line graphs which will be studied soon. Scales should always start with zero and the intervals should always be equal and evenly spaced. The value of a point can be determined by observing its placement on the scale.

Discuss the notation used on the scales on page 452. The symbol ⌇ or ⫽ is used to indicate a break in numbering on the scales. The notation is useful when data points are located in a small interval, but the numbers all have a large value.

≪PATTERNS≫

Encourage discussion of strategies for determining size of intervals and location of points. Students should recognize or discover patterns for the interval markings. Ask questions such as:

--What pattern occurs with the intervals 0, 10, 20, 30,...?

--What pattern can be used to complete the following interval?
0, ___, ___, ___, ___, 25

L. Bar Graphs, page A71 (make transparency)
A Time to Be Born, page 453
Bar-ring Hawaii, pages A72-A73
Double Vision, pages A74-A75

Objectives: To read bar graphs.
To understand bar graphs.
To make bar graphs.

Comments: Bar graphs are used to compare totals. The Mathematics Resource Project discusses bar graphs on pages 52-55.

≪READ AND INTERPRET DATA≫

The recreational activities bar graph on the transparency uses a scale which gives information for 1,000 residents. For example, 1000 residents go surfing a total of 33 times in one weekend. The bar graph is useful in comparing frequencies of different activities, but it does not identify the total number of times each activity occurs. Ask the students what additional information is needed to get these figures. (Answer: total number of residents in Hawaii). If total number of residents is 890,000:

$$\frac{890,000}{1,000} \times 33 = 29,370$$ occasions when surfing takes place.

≪HOW CAN DATA BE REPRESENTED≫

Problem 3 on Bar-ring Hawaii involves large numbers that fall within a small interval. Since graphs should always begin at zero so they won't be misleading, a break is used

to indicate the jump in numbers (from 0 to 150). Smaller intervals are used to give more detailed information.

«LIST RELATED FACTS»

Double Vision asks the students to read a graph which includes multiple sets of data. Everyone in the class should be responsible for understanding the first page. The examples should be discussed in class. However, the problem on the second page is more involved and the teacher may wish to have only the better students work on it.

M. Figures Never Lie, page 507
Butter Up the Cook, page 508
Food for Thought, page 509

Objectives: To understand that graphs can be misleading.
To understand that a scale should start at zero or there should be a zero break.
To examine deceptive bar graphs.
To make bar graphs.

Comments: These worksheets can be done by students individually or they can be completed through teacher-led discussion. Food for Thought can be made into a transparency to facilitate discussion.

«IS THE RESULT REASONABLE?»

If some students finish early or if other students need extra work in this section, page 730, Making Dollars and Sense is another worksheet which uses deceptive graphs to influence people.

«EXTEND TO REAL-LIFE SITUATIONS»

Ask students to bring in examples of graphs from newspapers or magazines. This activity can be carried on throughout sections N to R for the different types of graphs.

The graphs that students bring in can be critiqued and incorporated into a bulletin board display separating deceptive graphs from good examples.

«USE AND MISUSE OF GRAPHS»

Some questions to begin a critique include: What makes the graph misleading? What misinterpretation results from this? OR How does the graph help to interpret data? What points are highlighted?

N. A Trend for All Seasons, page 468 (make transparency)
Line Graphs, pages A76-A78

Objectives: To read line graphs.
To understand line graphs.
To make line graphs.

Comments: Line graphs usually represent a continuous relationship between two things. Often, one of the scales deals with time and the graph shows how something has changed with respect to time. Line graphs are discussed on pages 56-65 of the Mathematics Resource Project.

≪CLARIFY MEANING≫

When discussing A Trend for All Seasons, ask questions such as:

≪TRENDS AND PATTERNS≫

- --During what month were ice cream sales the largest?
- --What was the dollar value of ice cream sales in February?
- --When did the Plenty Flavor Parlor see $6,000 worth of ice cream?
- --What was the total dollar value of sales for the summer months (June, July, August)?
- --How much money was spent on heating in Citydale in May?

≪MAKE DECISION≫

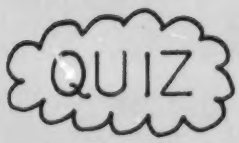
- --Do you think Plenty Flavor Parlor might be located in Citydale? Why or why not?

≪CAN INFORMATION BE USED FOR FORECASTING≫

Try to get the students to comment on the correlation between the two graphs. (In July and August, when the weather is hot, the most ice cream is sold and the least is spent on heating, and so on.

The Hawaii Tide Calendar is a very good example of line graphs. The tide is continuous and is displayed by a continuous line on the calendar. The peaks and valleys are easily identified as high and low tides.

Have the students find other examples of line graphs.



Quiz 2 should be given at this time. It is found on pages A119-A120.

O. Thinking Through Pie Charts, page 469 (make transparency and/or worksheets)
Going Around in Circles, page 470
Percent Review, page A79
The Budget Circle, page A80
The Family Circle, page 471
Constructing Information, pages A81-A82 (make transparency of page A81)

Objectives: To read circle graphs.
To interpret circle graphs.
To relate percents to circle graphs.
To review computation with percents.

Comments: Circle graphs are discussed on pages 51-52 of the Mathematics Resource Project.

≪SUMMARIZE AND INTERPRET DATA≫

Thinking Through Pie Charts can be presented as a transparency for class discussion or worksheets can be made for completion by students. Students should understand that a circle graph shows the fractional pieces into which a whole has been divided. The first circle graph shows how Rae Lynn used her entire allowance. The second graph gives a breakdown of the total population of smalltown.

≪IS CONCLUSION JUSTIFIED?≫

Information in a circle graph can be compared by looking at areas of circle represented by the different pieces or by comparing percents of the whole. It is possible to say that Mr. and Mrs. Sato spend five times more money on food than on clothing (see the Budget Circle).

When comparing information in two circle graphs more data is often necessary. It is important to know the amounts on which the percents are based (see The Family Circle). It is correct to say that each of two families spends 30% of their income on food, but this does not mean that the dollar amount spent is the same.

≪READ AND INTERPRET GRAPHS≫

Constructing Information presents information about Hawaiian Telephone Company's construction budget. Make a transparency of the first page and have the students analyze the information presented.

P. Working with Fractions, pages A83-A84
Your Share of the Pie, page 472
Circle Graphs, Step by Step, page A85
To Make a Circle Graph, page 473 (make transparency)
Circling Your Day, page A86

Objectives: To review fractions.
To write a fraction as a decimal and a percent.
To determine measure of central angles for circle graphs.
To make circle graphs.

«COMPUTE»

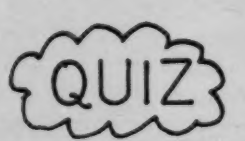
Comments: Working with Fractions provides a review of computations which will be necessary to make a circle graph. Point out to students that exercise 2e is easier to do if the fraction is first simplified. A class review of multiplication with fractions may be necessary before assigning exercise 3.

«OUTLINE APPPOACH»

The worksheet Circle Graph, Step by Step can be discussed and completed by the class as a whole. A transparency of To Make a Circle Graph can then be used to summarize the steps involved in making a circle graph. Students will not need protractors to complete these graphs. The 0°, 90°, 180°, and 270° marks are indicated on each circle. Problem solving techniques can be used to find the 150° mark, 45° mark, and so on.

«ESTIMATE»

Making a Circle Graph uses a table format to organize data before the final graph is drawn.



Quiz 3 should be given at this time. It is found on page A121.

Q. What Kind of Graph, page 475 (make transparency)
How Can We Display the Data, pages 476-477 (make transparency)

Objectives: To consider appropriateness of graphs.
To compare uses of graphs.

«LOOK AT ALTERNATIVES»

Comments: These pages should be used to promote discussion about bar graphs, pictographs, line graphs, and circle graphs. Should different types of data be displayed using different types of graphs?

≪APPROPRIATE VS. INAPPROPRIATE≫

A line graph is inappropriate to display the data for Languages of the World (see What Kind of Graph). There is no continuous relationship being represented. A bar graph would be better. In the second problem a circle graph could be used to indicate the breakdown of the total money spent on defense. A bar graph allows for direct comparisons, but does not indicate that pieces of a total amount are being seen.

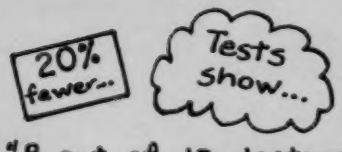
≪GENERALIZE RESULTS≫

R. This Doesn't "Ad" Up, page 503 (make transparency)
Examining the Facts, pages 505-506
Unit Review, pages A87-A90

Objectives: To examine the claims of advertisers.
To be aware of missing information in advertising.

Comments: Have students discuss the claims of the advertisers for each statement on This Doesn't "Ad" Up. The authors of the Mathematics Resource Project suggest that students consider these questions:

≪VERIFY≫



--Can the statement be checked?
--If so, how?
--If not, should it be considered meaningless?
--Is there enough good information given in this ad so you can accept the general truth of the statement?

Other suggestions for specific ads are provided on page 504 of the resource.

≪LOOKING BACK≫

Have students bring in ads from newspapers or magazines to discuss. Also, have them write down claims of advertisers on television commercials. How can the claims be checked?

Following the unit review, administer the Statistics unit test. It is found on pages A122-A125.

WORKSHEET ANSWER KEY

Page A61 Alphabet Numbers

Letter	Frequency	Letter	Frequency
A	26	N	21
B	4	O	28
C	6	P	7
D	11	Q	0
E	35	R	19
F	8	S	19
G	5	T	24
H	12	U	11
I	14	V	2
J	3	W	10
K	1	X	0
L	9	Y	8
M	2	Z	0

1. E, O, A, T, N

2. Q, X, Z, K, M, V

Page A62 Cryptic Code

Comparison with Alphabet Numbers worksheet: same top five (in different order); four of last five agree.

Decoded cypher: THE HARDEST THING FOR TWO PEOPLE TO DO IS TO KEEP A SECRET

Page A65 Weighty Numbers

1. 69 lbs.
   135 lbs.

Weight	Frequency
60-69	1
70-79	3
80-89	6
90-99	9
100-109	4
110-119	3
120-129	3
130-139	1
Total	30

2. 31 kg
   61

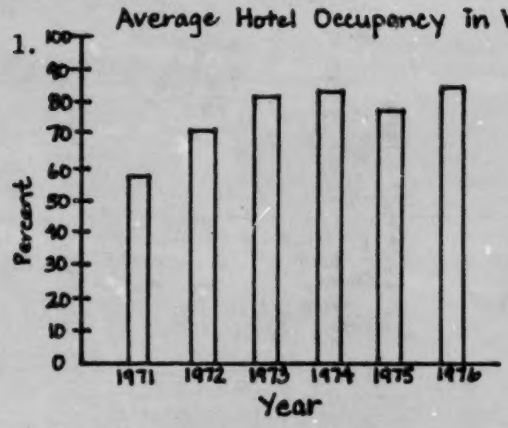
Weight	Frequency
30-34	2
35-39	6
40-44	8
45-49	7
50-54	3
55-59	3
60-64	1
Total	30

Page A66 Rounding

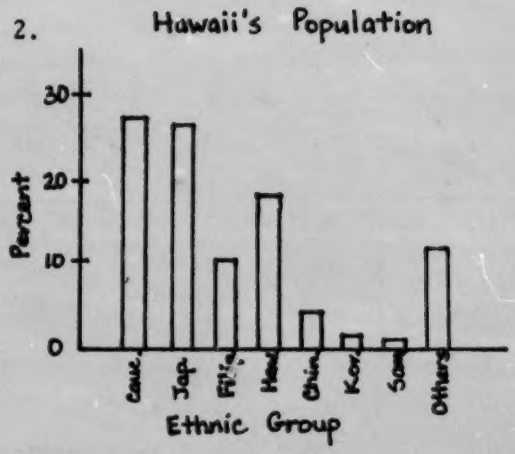
1. a. 4,812,238,550
   b. 4,812,000,000
   c. 4,812,239,000
   d. 5,000,000,000
   e. 4,812,200,000

Pages A72 - A73 Bar-ring Hawaii

1.



2.



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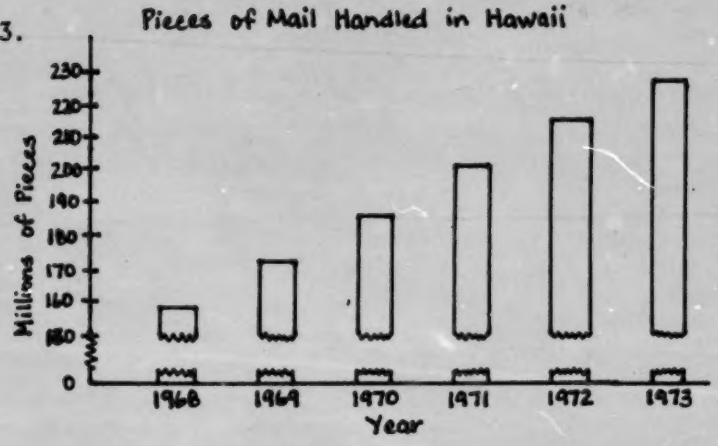


Pages A74 - A75 Double Vision

1. 15% 2. 60% 3. 62% 4. second language 5. science and second language (about the same)

6. can't tell (larger percentage failed science, but need to know enrollment before numbers can be compared)

7. the total enrollment in each course (100%) is represented on the graph.

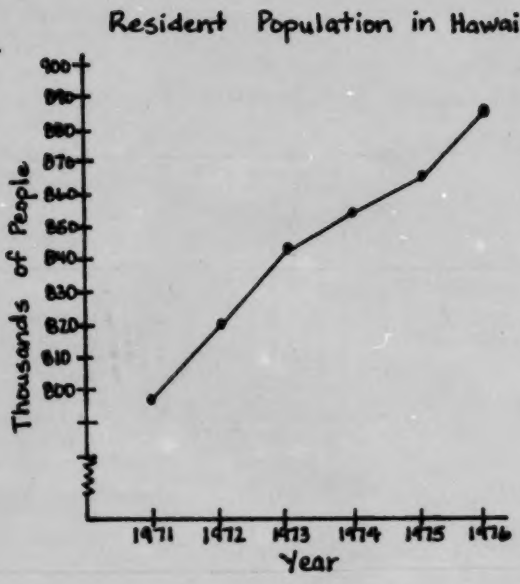
Pages A76 - A78 Line Graphs

1. a. ~410,000
   b. 1967
   c. ~150,000
   d. 1970
   e. 1973
   f. answers will vary

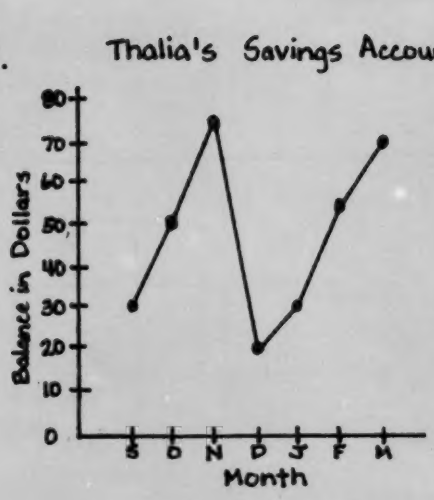
2. a. the number of people in Kilo City in 1950

   b. Data has not been collected. It represents the expected growth in 1970-80.

3.



4.



Page A79 Percent Review

1. b. .38 d. .19 f. .02 h. 1.00
   c. .75 e. .53 g. .125 i. .005

2. a. 90 b. 7 c. 8 d. 30.3 e. 27.5 f. 76

3. 365 people

4. a. 268 hours
   b. 227.8 hours

Page A80 The Budget Circle

1. a. 25%
   b. 38%
   c. 5%
   d. 20%

2. 12%

3. not enough information

4. b. $320
   c. $608
   d. $80
   e. $192

5. Rent = 608
   Clothes= 80
   Food = 400
   Trans = 320
   + Other = 192
   $1600
   Total makes sense.

Pages A81 - A82 Constructing Information

1. bar graph

2. a, e

3. $83,000,000
   a. $9,794,000
   b. $12,035,000
   c. $56,440,000

3. d. $1,596,153.80/week
   e. $228,021.97/day (assuming 7 day weeks)
   $266,025.63/day (assuming 6 day weeks)
   $319,230.76/day (assuming 5 day weeks)
   f. $3,320,000
   g. $64,740,000

Pages A83 - A84 Working with Fractions

1. a. $\frac{3}{4}$ b. $\frac{3}{7}$ c. $\frac{2}{5}$ d. $\frac{3}{10}$ e. $\frac{3}{7}$ f. $\frac{1}{2}$ g. $\frac{1}{5}$ h. $\frac{5}{6}$

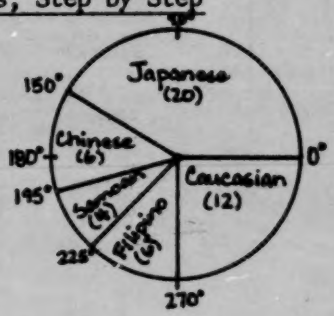
2. a. .5, 50%
   b. .7, 70%
   c. .4, 40%
   d. .125, 12.5%
   e. .25, 25%
   f. .1875, 18.75%
   g. $.83\overline{3}$, $83.\overline{3}\%$
   h. 1.25, 125%

3. a. 36
   b. 40
   c. 21
   d. 10
   e. 24
   f. 75

Page A85 Circle Graphs, Step by Step

b) 45°
c) 30°, 45°, 90°
e) 45, 195

f)

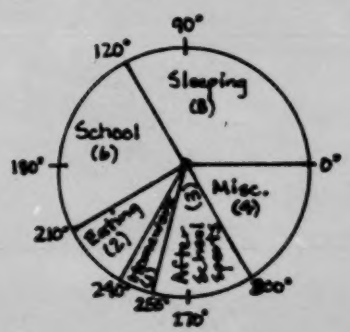


Eleventh Grade
Ethnic Background

Page A86 Circling Your Day

1.	Part of Whole Day	Central Angle Measurement
School	$\frac{6}{24} = \frac{1}{4}$	$\frac{1}{4} \times 360 = 90°$
Eating	$\frac{2}{24} = \frac{1}{12}$	$\frac{1}{12} \times 360 = 30°$
Homework	$\frac{1}{24}$	$\frac{1}{24} \times 360 = 15°$
After School Sports	$\frac{3}{24} = \frac{1}{8}$	$\frac{1}{8} \times 360 = 45°$
Miscellaneous	$\frac{4}{24} = \frac{1}{6}$	$\frac{1}{6} \times 360 = 60°$
Total	$\frac{24}{24} = 1$	360°

2.



Todd's Day

Pages A87 - A90 Unit Review

1. a, b, e

2. d, f, g, h

3. c; answers will vary

4. d; answers will vary

5.

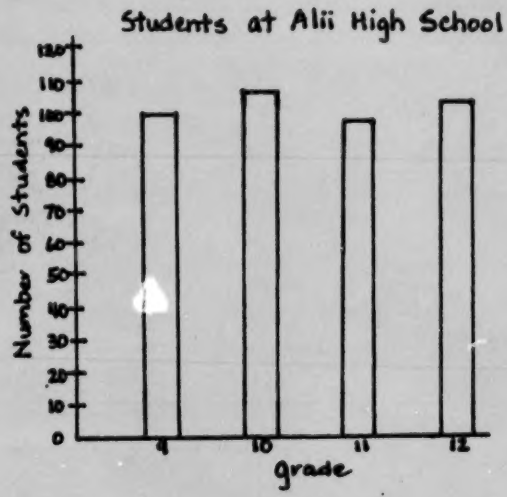
Number	Tally	Frequency
0	|	1
1	||	2
2	𝍸	5
3	𝍸 |	6
4	|||	3
5	||||	4
6	|||	3
7	||	2
8	𝍸	5
9	||||	4

6. a. 20,853
   b. $6,300,000
   c. 1963
   d. 903
   e. 29,598
   f. $47,500,000

7. a. $8\frac{1}{3}\%$
   b. same
   c. $16\frac{2}{3}\%$
   d. 25%
   e. 100%
   f. $33\frac{1}{3}\%$
   g. 12

8. a. Celeste
   b. February
   c. 3 months
   d. $40

9.



10. a. scale doesn't start at zero
    b. can't compare without knowing dollar amount for each
    c. when did person start using 'Pest-Control'?

QUIZZES AND TESTS ANSWER KEY

Pages A117 - A118 Quiz 1

1. a; It's not biased.
2. fact
3. answers will vary
4.

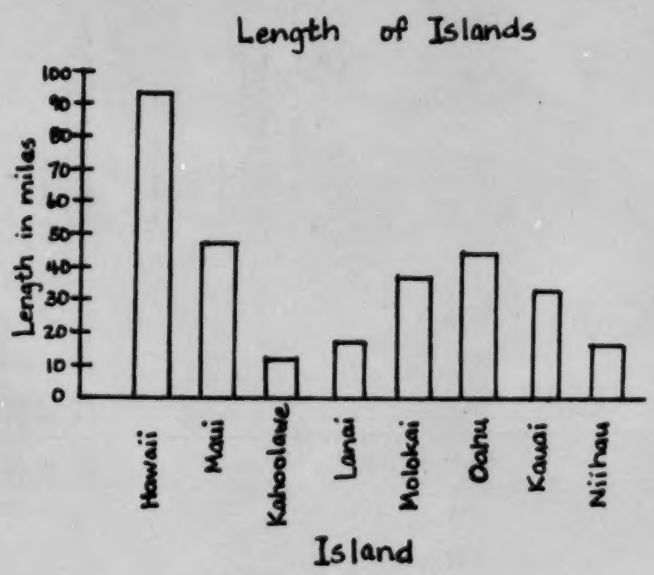
Number	Frequency
0	0
1	3
2	9
3	2
4	6
5	0
6	4
7	0
8	6
9	0
Total	30

5. a. 14,206
   b. hotel employment in 1969
   c. Hawaii Visitors Bureau or Hawaii State Department of Labor and Industrial Relations
   d. November
   e. $58,212,000
   f. 35,653
   g. b

BONUS: 6, 4, 6, 4, 8, 2, 1, 2, 1, 2, ... (The pattern starts with the numbers 1 and 2. The remaining numbers are found by multiplying pairs of consecutive numbers and adding each digit of the product to the pattern.)

Pages A119 - A120 Quiz 2

1. a. 20
   b. 130 cartons
   c. 270 cartons
2. a. $44.00
   b. 3
   c. 1
   d. can't tell
3.



Page A121 Quiz 3

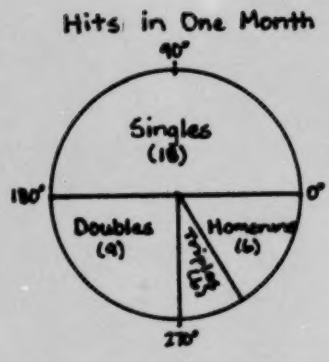
1. Community Service

2. 13%

3. $85,000

4.

Part of Total	Measure of Central Angle
$\frac{18}{36} = \frac{1}{2}$	$\frac{1}{2} \times 360 = 180°$
$\frac{9}{36} = \frac{1}{4}$	$\frac{1}{4} \times 360 = 90°$
$\frac{3}{36} = \frac{1}{12}$	$\frac{1}{12} \times 360 = 30°$
$\frac{6}{36} = \frac{1}{6}$	$\frac{1}{6} \times 360 = 60°$



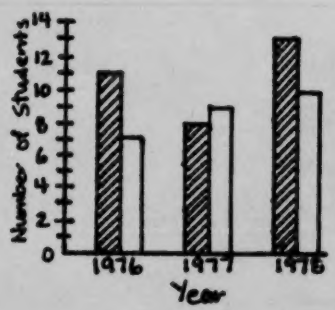
Pages A122 - A125 Unit Test

1. a. fact
   b. opinion
   c. fact
   d. fact
   e. opinion

2. a. 1971-72
   b. 353
   c. no
   d. 1968-69 and 1969-70
   e. 34,061

3. a. circle or pie graph
   b. Second Honolulu Bank
   c. 20%
   d. $12,000

4. a. bar graph
   b. 11 boys
   c. 17 students
   d. 13 boys
   f. 23 students



5.

Time (in min.)	Tally	Frequency
5	|	1
6	|||	3
7	||||	4
8	𝍸	5
9	𝍸 |	6
10	𝍸 |||	8
11	|||	3
12	|||	3
13	||	2
14		0
15	|	1

6. a. ~45,000
   b. 1920
   c. no
   d. ~62,000
   e. Hawaiian population is decreasing each year

7. a. 120
   b. 1977
   c. 160
   d. misleading; doesn't start at zero on scale

8. graphs will vary

UNIT II - CONSUMER MATHEMATICS

DESCRIPTION OF CONSUMER MATHEMATICS UNIT

A consumer is someone who obtains and uses an article or a service. We are all consumers and as such, we are required to make decisions regularly. Consumers spend a great deal of time doing comparison shopping. They need to be able to recognize and consider alternatives. This means they need the ability to work with numbers. There are specific skills that help a consumer to make wise decisions. One objective of this unit is to develop a competency with these skills which will extend beyond the classroom and into the students' everyday lives. This is reflected in objectives one and three of the eight Foundation Program Objectives adopted by the Department of Education (see page 30, Mathematics Program Guide).

The first two chapters of CM 1: Consumer Mathematics by Rand McNally Company are used as the basis for this unit. They cover food purchases and day-to-day expenses such as transportation. Skills required in each lesson are reviewed in sections called "Skills through Drill." These sections are grouped together at the end of the book and cross-referenced throughout the text and in the teachers' commentary for this unit. Also included in the book are "Be a Wise Consumer" sections which encourage students to apply the ideas developed in the course to everyday real-life situations. (For example, in the first chapter, there are activities such as going to the supermarket to price items, keeping a budget and planning a weekend trip.) Sections entitled "You Should Know" are good for class discussion. They provide students with background information, hints, or rules of thumb.

In addition to the text, supplementary worksheets are provided. These worksheets are intended to help students develop their problem-solving skills. The worksheets highlight specific strategies that are applicable to consumer-oriented problems and guide the student in reading the problem by identifying and sorting out the facts given in the text.

The problem-solving strategies are described in the teacher commentary under Problem-Solving Emphases. Specific activities and teaching suggestions are included in this section. In addition, problem-solving skills are flagged out between double arrows, ≪...≫ , in the left-hand margin.

The mathematics in this unit is both practical and relevant. Students are shown a need for the computations they are asked to perform. Consumer mathematics tries to actively involve students in real-life situations in the classroom. Many of the problems involve money; consequently, decimal computations occur throughout the unit. Both rounding and estimating occur in many of the problems since the consumer needs to be competent in these skills. Another objective of this unit is to develop an awareness that not all computations must be completed to solve a problem. For example, to compute and compare the unit prices, $.18365 and $.16437, of two products is neither

practical nor sensible. To compare $.18 and $.16 is more reasonable in this case. Many different symbols, phrases, and abbreviations are used in everyday transactions (e.g., 5/$.89, 7 @ $.30, $.89/oz., net income, etc.). By the end of this unit students should be both familiar and comfortable with them.

Hand-held calculators are becoming more available in both classrooms and in the students' homes. However, one reason students are taking this course is to develop a solid foundation in basic skills so that they can be effective problem solvers and consumers. Situations will always exist in which calculators are not handy and at least a quick estimation or mental computation is necessary. For these reasons, the use of the calculator to solve problems should be discouraged in this unit. There is, however, no need to discourage students from using a calculator to check their work.

Emphasis in this unit is on having the students "become aware of types of information available to the consumer and ways of assessing that information." There are many ways that these general topics can be extended depending upon interest and ideas generated in the classroom.

SUGGESTIONS FOR TEACHING CONSUMER MATHEMATICS UNIT

Text: CM 1: Consumer Mathematics. Chigago: Rand McNally, 1977.

An outline of objectives, materials, problem-solving emphases, and comments for teaching this unit is provided below. The teacher is encouraged to keep a commentary of the daily lessons on the space provided next to the outline. Notes about classroom management, how to extend the lesson, adequacy of materials, and so on can be included.

The dialogues and the text materials provide good examples in each section. It is important that the students READ and DISCUSS the lesson contents. One method that often works well is to have someone read the material aloud.

The Skill through Drill review sections may not be necessary for all students. The better students may benefit more from extending a topic than from doing a review of materials they already know.

NOTE:

Page Label	Description
1, 2, 3, ...	CM 1: Consumer Mathematics text
A33 - A59	Suggestions for Teaching
A91 - A116	Masters for Worksheets and Transparencies
A126 - A132	Quizzes and Tests

Chapter 1

A. Pre-Test, page A91
Identifying Facts, pages A92-A93
Identifying New Information, pages A94-A95
Understanding Questions, pages A96-A97

Objectives:
- To realize the importance of reading a problem carefully.
- To emphasize the need to follow directions.
- To understand the given facts in a problem.
- To recognize facts that can be derived from given information.
- To understand what information the question is asking for.

Problem-solving Emphases:

≪FOLLOW DIRECTIONS≫

The Pre-Test is designed to emphasize the importance of reading carefully and following directions.

≪CLARIFY MEANING≫

≪USE SUITABLE NOTATION≫

Understanding the vocabulary is an important part of problem solving. In addition, some students may be unfamiliar with notations that appear in everyday situations (e.g., $3/hour and M: 3-5 in problem #4 on Identifying New Information). Students should be encouraged to ask questions about terms or notations that they do not understand.

≪RESTATE THE PROBLEM≫

The worksheet, Understanding Questions, asks students to focus on what the problem is asking for. Students need to understand the problem well enough to recognize the question when it is restated.

Comments: These four worksheets are designed to encourage students to read carefully. Since the students are not asked to solve the problem, they should not be intimidated by the computations necessary to find the answers.

B. Food for Thought, pages 1-7
Skill through Drill, page 75
Using a List, page A98
Using a Table to Guess and Check, pages A99-A100
Food for Thought Worksheet, pages A101-A102

Objectives: To compute unit price of an item.
To compare the cost of two or more similar items.
To consider quantity vs. quality.
To be aware of hidden costs.
To understand that organizing information in a list or table simplifies a problem.
To realize that guessing can be a good strategy.
To understand the importance of checking an answer.

Problem-solving Emphases:

«GUESS AND CHECK»

Before assigning problems from the text, have students complete the worksheets, Using a List and Using a Table to Guess and Check. Depending on the ability of the class, it may be a good idea to discuss problems of a similar nature before students attempt these worksheets. Students need to understand that recording their wrong guesses is useful. (Is the answer too big? What should be changed?) Some students do not like to write down a "wrong" answer.

These two worksheets and those completed in section A above are designed to help students read the problems more carefully and organize their solutions.

«APPLY A SIMILAR PROCESS»

Questions that could be asked for almost all problems on pages 6 and 7 of the text include:

- What are the facts given?
- What is the question asking you to find?
- What information do you need to answer the question?
- Can you derive this information from the given facts?

«LIST ALL INFORMATION»

«REPHRASE THE QUESTION»

«LIST RELATED FACTS»

For example, before assigning the worksheet, Food for Thought, have someone read problem 8 on page 7 of the book out loud. Then ask the students what facts are given in the problem. List them on the board. Determine what the question is asking; can someone rephrase the question? A possible plan: can we find new facts by combining some of the given facts? (E.g., total distance is 30 miles; cost of gas is

30 mi. x 3¢ = 90¢.) Do any of these new facts answer the question asked? (Looking back to see if question answered and if so is the answer reasonable.)

«USE LISTS OR TABLES»

Problem 10 on page 7 can also be solved by using a table or an organized list. Specifically, for this problem, students could complete the two tables shown below and compare the results to answer the question.

Angelo's Pizza Palace	
Number of Pieces	Cost

Mr. Tony's Pizza Parlor	
Number of Pieces	Cost

«EXTEND THE PROBLEM»

In summarizing problem 10, discuss how organizing their work in lists or tables helped students "see" the answer. Other questions that could be asked include:

«LOOK FOR PATTERNS IN LISTS OR TABLES»

If each pizza is cut into 8 slices, what would the answer to the question be?

Does anyone see a shortcut to filling in the tables? (Do we have to begin with 1 piece?)

Comments:

«ESTIMATE»

This Skill through Drill emphasizes mental computations. Shortcuts and methods should be discussed (e.g., $2\overline{)39¢} \approx 2\overline{)40¢}$, so rounded to the nearest penny, the answer is 20¢). Also, some students may need a review on how to round fractions of a cent to the nearest cent.

Pages 4 and 5 introduce comparisons that are often judgmental. Consequently, the results are often both good discussion and confusion. Teachers should use their discretion about including these pages and related problems on pages 6 and 7 (#5-7).

Explain to the students that computations must be carried out until a comparison can be completed. For example, both 65 ÷ 12 and 38 ÷ 7 have the answer 5 and a remainder. A comparison cannot be made until more complete quotients are found, i.e., 5.41... and 5.42....

C. Eating Out, pages 8-10
Skill through Drill, page 76
Logic Table Transparency, page A103
Logic Table Worksheet, pages A104-A105

Objectives: To compare alternatives.
To read and understand a menu.
To determine the cost of a meal.
To determine what is the best buy.
To use tables to organize information.
To use logic in solving a problem.

Problem-solving Emphases:
These logic tables help students to organize the given facts and derive new information by relating the given facts. A sample problem that can be made into a transparency is provided on page A103.

≪INTRODUCE SUITABLE NOTATION≫

Do the problem on the transparency with the entire class. Demonstrate when to place an X in a box and when to use a dot. Also stress that once the placement of a dot is determined, the remaining boxes in that row and column can be X'ed out. Why? Sometimes clues must be combined. And sometimes clues must be used more than once.

≪CLARIFY VOCABULARY≫

Make sure that students understand the meaning of "à la carte." Be sure to discuss the "fine print" on the menu ("All dinners include soup or juice,..."). Students don't always realize that dinners include extras.

≪STATE CONDITIONS GIVEN≫

≪CHECK YOUR ASSUMPTIONS≫

If possible, get menus from local restaurants with which students are familiar. Have them compare special combination prices to à la carte prices. They may find that sometimes the specials aren't really special!

≪STUDY TABLES≫

≪ORGANIZE DATA IN A LIST OR TABLE≫

Students may need help organizing their work for problem 2. If you have menus from local restaurants, a similar problem could be discussed in class with emphasis on what information is needed and how this information should be organized to help answer the question. In problem 2, students may find it useful to organize a list such as the one started below. The beverage is an unnecessary item for the list since it is included in all cases. Prices could be written in a column to simplify addition and an X could be used where an item, such as soup, is included in the dinner price. Note that the pork chops dinner does not include any salad.

Salmon dinner		À LA CARTE		
Type	Dinner	Tossed Green	Caesar	Cole Slaw
Soup	X	.35		
Meat or fish	$6.00	4.50		
Salad	X	1.00		
Total	$6.00	5.85		

≪APPLY TECHNIQUE TO SIMILAR PROBLEMS≫

Concluding discussion might include asking students why, in most cases, the à la carte dinners were cheaper. Students could be asked to solve similar problems based on menus from local restaurants. Problem 3 on page 10 is similar, but simpler, than problem 2.

D. Pizza Pains, pages 11-15
Skill through Drill, page 77
Using Known Facts, page A106
Pizza Pains Worksheet, pages A107-A108
Be a Wise Consumer, page 15 (optional)

Objectives: To consider alternatives.
To compute costs.
To compare costs.
To recognize the need to use universally accepted facts.

Problem-solving Emphases:

«USE RESOURCES»

«CLARIFY VOCABULARY»

Before discussing the chart on page 13 in the text, do the worksheet, Using Known Facts, so students will recall the equivalents (e.g., 16 oz. = 1 lb). The other skill students need to review is when to multiply or divide to obtain the information required for the tables.

«DETERMINE NATURE OF ANSWER»

Some of the computations used to complete the chart on page 13 should be done together in class. Be sure to include some discussion on when a cost can be considered negligible.

«DETERMINE NATURE OF ANSWER»

Problem 2 on page 14 should be done as a class project or in small groups during class. A table has been started on the Pizza Pains worksheet. The computations are lengthy and if left to do the problem alone, many students would give up, either frustrated or defeated. Point out that the goal is to find the cost per serving, not just the cost of making the chili.

«OUTLINE THE PROBLEM»

There is also a guide for problem 3, page 15, on the Pizza Pains worksheet. A possible answer to the last question on page A108 is to follow the sequence outlined in the margin of the teacher's edition. You could discuss this orally and give students the assignment of writing a problem-solving guide for this alternative.

«CHECK YOUR RESULT AND PROCESS»

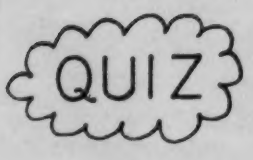
After students have completed problem 3 using two methods, compare the answers. Are they the same? If not, why not? This exercise can bring out discussion on how rounding affects the final answer, whether the differences in the answers are "close enough," and what degree of accuracy is required.

PLAN AHEAD

Comments:

The "Be a Wise Consumer" activities can be done by the students individually or in small groups. If this section is assigned to students, they should be given plenty of time to complete it as a trip to a grocery store is required.

Perhaps, if there is a grocery store conveniently located, the class can visit the store to get prices and to do some comparison shopping. Be sure to get approval from the store manager before the class goes!



Quiz 1 should be given at this time. It is found on page A126.

E. At the Supermarket, pages 16-19
Skill through Drill, page 77 (bottom)
Be a Wise Consumer, page 20 (optional)

Objectives: To compute unit prices of items.
To determine what is the best buy.
To understand that stores round up to the next penny.
To realize that money isn't saved if more is bought than can be used!

Problem-solving Emphases:

≪DEFINE TERMS≫

≪CLARIFY PROCESS≫

Be sure to discuss rounding before students begin work on the problem set. Grocery stores don't use the same rules for rounding that mathematicians use. They round up to the next penny.

≪USE OF TABLES≫

Help students read the table on page 16 and relate it to the cartoon on page 17. The information on egg prices may be organized into table form also.

≪CLARIFY NOTATIONS≫

≪ORGANIZE INFORMATION IN A LIST≫

Before doing problem 1 on page 19, be sure students know how to read the ad. Discuss abbreviations and symbols incorporated. Ask students how they could organize the information to compare prices and decide which store offers the better buy. This is especially important for them to answer subsequent questions (#2, page 19 and #1 on page 21) that are related.

Comments:

≪REAL-LIFE APPLICATION≫

The prices used in this unit are not reasonable for Hawaii. Perhaps some students can compare Hawaii's prices to those given in the book. If the class visits a supermarket, prices can be gathered then.

Most supermarkets post unit pricing information on the shelves below each item. Discuss how this information helps the consumer and how this can eliminate many of the calculations done in this section.

F. Buy a Bunch, pages 20-22
Simplify the Problem, page A109

Objectives: To consider saving money by buying in large quantities.
To realize that buying in quantity is economical only if all of the item can be used.
To use an easier problem to help solve the original problem.
To recognize patterns.
To observe relationships between pairs of numbers.

Problem-solving Emphases:

«LOOK AT A SIMILAR PROBLEM»

Students often draw a blank when they see decimals and fractions even though they really know how to solve the problem. The worksheet, Simplify the Problem, is designed to help students look for the process involved. If students look at the problem with whole numbers replacing the decimals or fractions, they often find that they do know what process to use after all!

In the discussion of this section, try to establish the two patterns (or operations) required to solve the problem:

1. If you are asked to find the unit cost, you divide.

2. If you are given a unit cost (or savings) and are asked to determine cost (or savings) of a bulk purchase, you multiply.

«APPLY THE PROCESS USED TO SOLVE SIMILAR PROBLEMS»

The students then need to determine which of these two operations is required for a given problem. Ask students to look for clues to determine which operation is implied.

Comments: In exercise 1 students should be aware that two computations are necessary to find the unit price of each of the cereals (price per case ÷ # boxes ÷ # ounces).

Parts c and d of exercise 2 may also require some extra effort. Students should discuss the different ways to compute savings.

A review of division with fractions (or decimals) may be necessary for exercise 3.

G. Metric Shopping, pages 22-23
Skill through Drill, page 78 (top)
Be a Wise Consumer, page 23 (optional)
How Metricated Are You worksheet (for use with Be a Wise Consumer), page A110

Objectives: To consider methods of comparison other than unit pricing.
To practice mental computations.
To review multiplying and dividing with decimals.

Problem-solving Emphases:
The method of comparing sizes and prices by using multiples should be discussed in class. One or two problems should be demonstrated before assigning the problems on page 23.

Students have two strategies in determining the better buy:

1. finding unit prices by dividing, then comparing.

   Example: 12 oz. box of oatmeal costs 47¢ → 1 oz. costs .039¢

   16 oz. box of oatmeal costs 65¢ → 1 oz. costs .041¢

   .039¢ < .041¢, so the 12 oz. box is the better buy

2. using an equivalent multiple, then comparing.

Example: 25 ml tube of toothpaste costs $.59

75 ml tube of toothpaste costs $1.79

3-25 ml tubes are the equivalent of 1-75 ml tube; 3 x $.59 = $1.77.

$1.77 < $1.79, so the smaller tube is the better buy.

≪STATE CONDITIONS OF THE PROBLEM≫

≪GENERALIZE THE SOLUTION PROCESS≫

Provide students with examples of both strategies. Ask them to decide which of the two strategies is "easier" for a particular problem and why that is the case: What are their clues? What do they look at first? (the quantities involved)

For students who have trouble organizing their work, you may suggest that they draw a line down their paper. For each problem, one calculation could be done on the right and the other on the left.

Comments: The worksheet, How Metricated Are You, is included to help students organize the information in the "Be A Wise Consumer" section.

H. Budgeting for Food Costs, pages 24-25
Skill through Drill, page 78 (bottom)
Be a Wise Consumer, page 26 (optional)

Objectives: To understand that a budget is a plan for spending.
To understand why budgeting is often necessary.

Problem-solving Emphases:

≪LIST ALL INFORMATION≫

≪PATTERNS≫

Given either weekly, monthly, or yearly income discuss how to find the others. Have students recall that 52 weeks = 1 year and 12 months = 1 year. Discuss patterns that emerge from converting yearly income to monthly income, and so on. When do you divide? When do you multiply?

See discussion of problem 3c on page 25 in Teacher Edition. Discuss two ways of getting the answer. Compare the answers. Ask students which method gives the more accurate answer and why.

Comments: Some students will need to review changing a percent to a decimal.

TEST

Chapter 1 Test should be given at this time. It is found on pages A127-A128.

Chapter 2

I. Getting There and Back, pages 27-29
Skill through Drill, page 79 (top)
Getting There and Back worksheet, pages A111-A112
Be a Wise Consumer, page 29

Objectives: To compare costs of different types of transportation.
To consider hidden costs of transportation.
To compute costs of different types of transportation.
To determine yearly costs from daily costs.

Problem-solving Emphases:
The Getting There and Back worksheet on pages A111-A112 should help students who have difficulty with problems 2-5 on page 29. The worksheet provides practice in several problem-solving skills:

≪LOOK FOR PATTERNS≫

a) Problems 1-4 establish a pattern from which a generalization is made in problem 5.

b) Problems 6-10 on the table provide opportunity to develop techniques in reading a table using patterns:

≪STUDY TABLES≫

Reading from left to right:

distance traveled by taxi x 10 = # of tenths of a mile

# of tenths of a mile x mileage charge/tenth = total mileage charge

total mileage charge + base fee = total charge

Reading from right to left:

total charge - base fee = total mileage charge

total mileage charge ÷ mileage charge/tenth = # of tenths of a mile

# of tenths of a mile ÷ 10 = distance traveled by taxi

Discussion on the relationship between + and - , and x and ÷ can be incorporated also.

«WORK THE PROBLEM BACKWARDS»

c) Page A112 provides a step-by-step analysis of problems 4 and 5 found on page 29 of the text. Class discussion could "work backwards" through the problems. What is the question asking you to find? What information do you need? What information are you given? How can you use the information given to help you?

Comments: Work with the students to complete the table on page 28. Also, be sure they understand the process in the illustration on page 28. A similar process must be used in exercise 4. Students should realize that a hidden cost of taxi rides is the tip!

«REAL-LIFE APPLICATION»

Students might be interested in comparing prices of taxis in Hawaii with those given in the book. Also, how does the cost of a pedicab in Waikiki compare? How do pedicab drivers determine their rates?

J. Away for the Weekend, pages 30-33
Skill through Drill, page 79 (bottom)
Away for the Weekend worksheets I and II, pages A113 and A114
Be a Wise Consumer, page 33

Objectives: To compute cost of gasoline, number of gallons needed, miles per gallon, and total distance driven.
To consider costs involved in taking a trip.
To compare costs of different modes of travel.

≪COMPUTE≫

Problem-solving Emphases:
This section requires many computations of gasoline costs. Begin with worksheet I and the Skills through Drill exercises. Worksheet I, page A113, deals separately with total cost and total distance driven. The Skill through Drill combines these computations and determines the gasoline cost for a trip given distance, miles per gallon, and the unit cost of gas.

≪BREAK PROBLEM INTO PARTS≫

On Worksheet I, ask students to explain the relationships among the columns on the table. For example,

≪READ TABLES≫

# of gallons x price/gallon = total cost of gasoline

≪LOOK FOR PATTERNS≫

average # m.p.g. = total distance ÷ # of gallons

Away for the Weekend I should be completed and discussed before assigning exercises in Skill through Drill on page 79. Determine a format for a table to organize the given information in Skill through Drill on page 79.

Complete the tables on pages 30 and 31 while reading and discussing this section with the students. Encourage discussion of how the problem has been over-simplified (e.g., cost of groceries not considered).

≪BRAINSTORM ON ASSUMPTIONS≫

Away for the Weekend II is a guide for solving problems 1, 2, and 6 in the text. After completing this worksheet, small groups of students could be asked to make up a guide for problems 3-5 on pages 32 and 33 following the format on

≪OUTLINE STEPS USED TO SOLVE PROBLEM≫

Worksheet II, page A114. Other students could use these guides and critique them.

≪GENERALIZE SOLUTION PROCESS≫

In discussing problem 5 in the text, see if students recognize it as another unit price problem.

Comments:

≪REAL-LIFE APPLICATION≫

Be a Wise Consumer can be conducted as team projects. Everyone can be assigned the same destination and time period. However, each team can be assigned different styles of travel (e.g., car, bus, camping, hotel, etc.).

K. Expenses for Fun, page 34
Expenses for Fun worksheet, page A115
Be a Wise Consumer, page 35

Objectives: To compare costs.
To determine costs of alternatives.

Problem-solving Emphases:

≪APPLY PROCESS USED TO SOLVE SIMILAR PROBLEMS≫

Since this problem set combines some of the ideas previously covered, students should be asked to apply those techniques to similar problems on this page. The Expenses for Fun worksheet, page A115, is a guide to problems 5 and 6 in the text.

Comments:

USE OF STATISTICAL PROCEDURES

The Be a Wise Consumer section provides students an opportunity to collect and organize their own data. Students could compare their results with others and analyze their expenditures.

L. It's a Good Job, But..., pages 35-36
Skill through Drill, page 80 (top)

Objectives: To consider job-related expenses.
To consider hidden costs.
To compute income and income after expenses.

Problem-solving Emphases:

≪CLARIFY MEANING≫

Students should realize that net income in these problems refers only to income after expenses. Discuss the types of deductions that are made before take-home pay is determined.

«OUTLINE STEPS USED TO SOLVE PROBLEM»

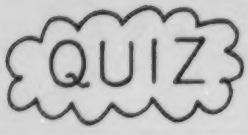
In class discussion, emphasize that there are three steps in computing income after expenses for each job: 1) compute income; 2) compute expenses; and 3) subtract. If two jobs are being compared, each of these three steps must be done for each job.

«ORGANIZE INFORMATION INTO LISTS OR TABLES»

The three steps in computing income may be organized in a list or a table with appropriate headings; for example, gross income, expenses, net earnings.

«LIST ALL INFORMATION AND RELATED FACTS»

Some students may need a review of identifying facts and relating given facts to find a new fact. For example, four hours a day, three days a week means _____ hours a week of work.



Quiz 2 should be given at this time. It is found on page A129.

M. Sales Tax, pages 37-38
Skill through Drill, page 80 (bottom)
Be a Wise Consumer, page 39

Objectives: To compute sales tax.
To change percents into decimals.
To read a tax table.
To use a table to determine sales tax.
To realize that sales tax is a hidden cost of many purchases.

Problem-solving Emphases:

«COMPUTE»

Students will need to review the writing of percents as a decimal. Some of this is done in the Skill through Drill section, but this may not be sufficient (especially for percents such as 6.5%). Doing a few problems at the board to start each class may be useful.

«CLARIFY MEANING OF TABLE»

If at all possible get copies of the Hawaii sales tax table from a local store or bank. Some students may need help reading the Hawaii sales tax table. They may not realize (look at example on page 37 in text) that .51 - .69 means .51, .52, .53,... .68, .69.

Students should understand that the sales tax which consumers pay is not exact; it is rounded. Some states always round the tax up to the next penny. See if they can find out how Hawaii rounds taxes! This is great for practicing problem-solving techniques.

≪ESTIMATE≫

In addition, students should learn to estimate the sales tax for any purchases they make.

N. Two Tens for a Five, pages 39-41
Skill through Drill, page 81

Objectives: To conduct money transactions.
To make change.

Materials: (Optional)

Pennies	Paper $1 bills
Nickels	Paper $5 bills
Dimes	Paper $10 bills
Quarters	

Problem-solving Emphases:

≪REAL-LIFE APPLICATION≫

It is amazing how many students must first do the subtraction problem, $20.00 - $5.83, with paper and pencil before they can make change given a $20 bill on a $5.83 purchase. Most of them have never considered counting back change, even though, many times, money is returned to them that way in stores. Many students don't count their change to see if it is the correct amount.

≪ACT OUT THE PROBLEM≫

Have different students play cashier at the front of the room. Give the cashiers a chance to really make change for "purchases" by customers. The concept is understood and makes a much bigger impression when the students have to act out the situation.

As the students get better at counting out change, customers can purchase jeans for $14.95 plus tax, etc. Determining the sales tax is a good mental computation.

≪EXTEND THE PROBLEM≫

Newspaper ads for sales may be brought in for faster students to make up

problems involving purchases, sales tax, and change. These could be dittoed and distributed to others, or posted on bulletin boards for those interested.

Other extensions include having the students consider making change for a $3.76 purchase when a $5 bill and a penny are given to the cashier.

O. Running Up the Bill, pages 41-43
Skill through Drill, page 82

Objectives: To estimate a shopping bill.
To round to the next highest 5¢, 10¢, 25¢, $1, etc.
To calculate running totals.

Problem-solving Emphases:

≪MENTAL COMPUTATIONS≫

Estimating a bill is an important consumer skill. People estimate when they're not sure if they have enough money, when they want to "know" the total cost before making a purchase, etc.

Discuss the advantages and disadvantages of rounding costs and rounding up to the next highest unit (5¢, 10¢, etc.). The mental computations are easier when prices are rounded to the nearest $.25 and $1.00 than when they are rounded to the nearest $.05 and $.10. Remind them that sales tax is an important part of the final estimate.

Discuss the difference between the actual totals and the estimated totals. When prices are rounded up, the difference is likely to be larger when rounding to the nearest $.25 and $1.00 than to the nearest $.05 and $.10.

≪EXPLAIN PROCESS≫

Can the students explain why this is so?

≪ANALYZE TABLES≫

Discuss the purpose of the table on page 43. Emphasize that the last column represents the Running Total.

Comments: Skill through Drill can be done orally in class. This gives the students more practice in mental computations, more examples to follow and a better chance for understanding.

P. That isn't Exactly Right, pages 44-46
Skill through Drill, page 83 (top)
That isn't Exactly Right worksheet, page A116

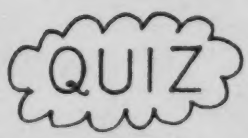
Objectives: To verify a check received in a restaurant.
To read and understand a menu.
To determine the cost of a meal.
To write guest checks for meals.

Comments: The Skill through Drill section should be completed before the Problem Set is assigned. It asks students to write guest checks from scratch. Students usually find this easier to do than finding errors on checks that have already been written.

«CHECK RESULTS»

The worksheet for this section provides blank guest checks to use in the exercises. This should help students to organize the information provided. Point out that even though these guest checks have a space for tax, tax is not always charged.

A good way to conclude this chapter is by discussing tipping. It is useful to be able to estimate a tip quickly. Also, it is often convenient to round totals when estimating a tip so that an even amount including the tip can be paid.



Quiz 3 on page A130 should be given at this time. The quiz should be given at the beginning of a period if at all possible. Then the questions can be discussed and a review of the entire consumer math unit can be held during the last part of the period.

The Consumer Mathematics unit test should be given at this time. The unit test is found on pages A131-A132.

WORKSHEET ANSWER KEY

Pages A92-A93 Identifying Facts

1. a 2. c 3. d 4. c 5. b 6. c

7. d 8. a *9. c

Pages A94-A95 Identifying New Information

1. a 2. d 3. d 4. b 5. b 6. a

7. a 8. c

Pages A96-A97 Understanding Questions

1. c 2. c 3. d 4. d 5. b 6. c *7. b

Page A98 Using A List

1. 214, 241, 421, 412, 124, 142; By the hundreds digit

2. 444, 441, 442, 411, 414, 412, 421, 424, 422; 111, 112, 114, 122, 121, 124, 141, 142, 144

3. 8 (555, 553, 535, 533, 333, 335, 353, 355)

4. 6 (Evans, Eric, Tom; Evans, Tom, Eric; Eric, Evans, Tom; Eric, Tom, Evans; Tom, Eric, Evans; Tom, Evans, Eric)

5. 5 (50, 0, 0; 40, 10, 0; 30, 20, 0; 30, 10, 10; 20, 20, 10)

6. 12:

P	N	D
25	-	-
20	1	-
15	2	-
15	-	1
10	3	-
10	1	1
5	4	-
5	2	1
5	-	2
-	1	2
-	3	1
-	5	-

7. 8: JGBK
JGKB
GJBK
GJKB
BKJG
BKGJ
KBGJ
KGJG

8. 8: 9, 1, 0
8, 2, 0
7, 3, 0
7, 2, 1
6, 4, 0
6, 3, 1
5, 4, 1
5, 3, 2

*9. 250:

Page #	# Pages	# Digits
1 - 9	9	9
10 - 99	90	180
100 - 199	100	300
200 - 250	51	153

} 642 digits

Pages A99-A100 Using a Table to Guess & Check

1. 8, 18
2. 12, 60
3. 24 cows, 18 ducks
4. 20 nickels, 40 dimes
5. 75 student, 50 adult

Pages A101 - A102 Food for Thought

I. a. 13.6¢
b. 73.2¢
c. $.043
d. 7.8351
e. 6.111
f. 2.1436

II. a. $.765
b. 26¢
c. 5.25
d. .7

III. 8. a. Sam's Hamburger Haven and drive-in
b. gasoline for car
c. 15 x 2 = 30 miles
d. 30 x 3¢ = 90¢
e. 80¢ + 90¢ = $1.70
f. No, it costs him 65¢ more
g. 80¢ $1.05 25¢
h. 90¢ ÷ 25¢ = 3.6 ≈ 4 hamburgers
i. at least 4 hamburgers

10. a. one whole pizza (6 slices)
b. $2.50
c. one pizza for $2.50
d. order 2 pizzas for $5.00
e. 2 pizzas, $5.00
f. You have to eat seven slices at Angelo's for the special to be worthwhile.

Pages A104 - A105 Logic Tables Worksheet

1. Billy - volleyball, Allen - football, Kirk - soccer
2. Mr. Enger - Math, Mrs. Horiuchi - English, Ms. Sato - History, Mr. Miyashiro - Science
3. Tom - 1st, Dave - 3rd, Marie - 2nd, Carol - 5th, Bob - 4th
4. Gloria - pilot, Evelyn - co-pilot, Linda - engineer, Annette - navigator

Page A106 Using Known Facts

2. number of ounces in 1 pound (1 lb. = 16 oz.)
3. number of inches in 1 foot (1 ft. = 12 in.)
4. number of months in 1 year (1 yr. = 12 mo.)
5. number of minutes in 1 hour (1 hr. = 60 min.)
6. how many in one dozen? (1 doz. = 12 things)
7. number of decimeters in 1 meter (1 m = 10 dm)

Pages A107 - A108 Pizza Pains

I.

ITEM	PACKAGE PRICE	UNIT PRICE	AMOUNT IN RECIPE	COST
oil	16 oz., 80¢	*5¢/oz.*	3 tbsp = *1.5* oz.	*7.5¢*
onion	*3 lbs., 87¢*	*29¢/lb.*	1 lg. onion = *.5* lb.	*14.5¢*
green pepper	*1 lb., 45¢*	*45¢/lb.*	*1 pepper = 1/3 lb.*	*15¢*
meat	*99¢ a pound*	*99¢/lb.*	*1 pound*	*99¢*
water	--	--	*1 cup*	--
tomatoes	*33¢ a can*	*33¢*	*1 can (1 lb.)*	*33¢*
tomato sauce	*25¢ a can*	*25¢*	*1 can (8 oz.)*	*25¢*
chili powder	*2 oz can,36¢*	*18¢/oz.*	*2 tbsp = ⅛ oz.*	*9¢*
salt	--	--	*½ tsp.*	--
bay leaves	*pkg of 25,49¢*	*2¢/leaf*	*1 leaf*	*2¢*
paprika	--	--	*dash*	--
cayenne	--	--	*dash*	--

Total cost = 205¢ Per Serving = \$2.05 ÷ 6 ≈ 34¢

II. a. 4

b. 99 ÷ 4 25¢ for one

c. 48 ÷ 6 = 8¢ for each bun

d. 25¢ + 8¢ = 33¢ (cost to make her own hamburger)

e. 33¢ x 5 = \$1.65 to make 5

f. 52 weeks = 1 year

g. 52 x \$1.65 = \$85.80

h. 80¢
80¢ x 5 = \$4.00 (cost for one week)

i. \$4.00 x 52 = \$208.00 for the year

j. \$2.08 - 85.80 = \$122.20 (amount she could save)

k. Answers will vary

l. 80¢ - 33¢ = 47¢ (amount she would save each day)
47¢ x 5 = \$2.35 (amount she would save each week)
\$2.35 x 52 = \$122.20 (amount she would save in one year)

Page A109 Simplify the Problem

1. vary; 18.87 ÷ 7.4 = 2.55

2. vary; 7200 ÷ 2-1/4 = 1600

3. vary; 3482 x \$.075 = 261.15

4. vary; 3394.6 ÷ 154.3 = 22

Page A110 How Metricated Are You?

Answers will vary.

Pages A111 - A112 Getting There and Back

1. a. 10 b. 10
2. a. 30 b. 30
3. a. 50 b. 50
4. a. 23 b. 23
5. ten

	Distance traveled by taxi	# of tenths of mile	mileage charge / tenth	total mileage charge	base fee	total charge
6.	2 miles	20	8¢	$1.60	75¢	$2.35
7.	4 miles	40	10¢	4.00	80¢	$4.80
8.	7 miles	70	9¢	6.30	70¢	$7.00
9.	3.5 miles	35	6¢	2.10	$1.00	$3.10
10.	4 miles	40	8¢	3.20	75¢	$3.95

Problem 4:

a. 35¢

b. 70¢

c. 180

d. 70¢ x 180 = $126.00

e. 2

f. 360

g. one set = 15 tickets
24 sets ($\overline{360}$ ÷ 15 = 24)

h. $4.00
$4.00 x 24 = $96.00

i. $126 - $96 = $30 savings

j. 65¢ x 180 = $117
$117 - $96 = $21 savings

Problem 5:

a. 15 60¢ 4¢

b. 20 miles

c. 20 x 4 = 80¢

d. 80¢ 20¢

e. Answers will vary

f. Yes, answers will vary

Page A113 Away for the Weekend I

1. # of gallons x cost/gallon
2. $4.32
3. $5.33
4. $.57
5. 7
6. 6.8
7. # of gallons x average m.p.g.
8. 126 miles
9. 137.2 miles
10. 8
11. 20

Page A114 Away for the Weekend II

Problems 1 and 2

a. $32/night $64

b. 350 ÷ 12 ≈ 29.2 gal.

c. $18.10

d. $82.10

e. $50.00 10¢

f. $35.00

g. $85.00

Problem 6:

a. 154 ÷ 48 ≈ 3.2 gal.

b. 3.2 x $.67 ≈ $2.14

c. 154 ÷ 55 = 2.8 gal.

d. 2.8 x $.67 ≈ $1.88

e. 154 ÷ 32 ≈ 4.8 gal.
4.8 x $.67 ≈ $3.22

Page A115 Expenses for Fun

Problem 5:

a. 30 b. 40 1200 c. 1200 ÷ 18 = 66.6 gal. d. $41.35 = cost of gas for surfing

Problem 6:

a. 10 ÷ 2 = 5 pairs b. 5 x $45.20 = $226.00 c. 1 for $20.00 d. $246.00

e. $246 ÷ 300 = $.82/trip for equipment $1.20/trip for gas

Page A126 Quiz 1

1. 12 oz. potato chips for $1.69 (cost per ounce is .14083; cost per ounce for 8 oz. potato chips is .14875)

2. $.45

3. 2 hamburgers = 2 x $.95 = $1.90
   french fries .40
   large cola .50
   $2.80

   (can't order lunch plate as beverage and hamburger are wrong size)

4. à la carte is less expensive: cheeseburger = $.75
   cole slaw = .35
   root beer = .30
   $1.40

   plate: $1.45

5. $.18 $1.08 ÷ 3 = $.36 (cost per pound) one onion = 1/2 lb = $.18

Pages A127 - A128 Chapter 1 Test

1. a. $2.89 ÷ 4 = $0.7225
   b. $5.15 ÷ 8 = $0.64375
   c. the 8 oz. jar

2. 150 ml tube

3. a. 2 slices - 1.80
   salad - .80
   medium drink - .30
   $2.90

   b. 30¢

4. a. .23 x $12,000 = $2760
   b. $2760 ÷ 12 = $230

5. $2.40 ÷ 3 = $.80 per roll
   $.80 x 5 = $4.00 for five rolls

6. a. $1.38 ÷ 6 = $.23
   b. $.23 ÷ 12 = $.01916 or ≈ 1.9¢

7. a. ice cream: $1.40 ÷ 4 = $.35
   hot fudge: $1.20 ÷ 6 = .20
   $.55

   b. 20¢

   c. Answers will vary (e.g., transportation costs, cost of washing dishes)

Page A129 Quiz 2

1. base fee = .80
   mileage = 40 x 7¢ = 2.80
   $3.60

2. 240 x 2 = 480 trips each year
   480 x 25¢ = $120.00

3. 150 mi. ÷ 15 m.p.g. = 10 gal. of gas
   10 gal. @ $.70 = $7.00

4. a. 4 x 3 = 12 hrs/week
   $2.75 x 12 = $33.00

   b. 3 days x 2 rides/day = 6 rides
   6 rides @ 25¢ = $1.50
   $33.00 - $1.50 = $31.50

Page A129 (continued)

5. Bus: $15 x 2 tickets = $30.00
Car: 35 gal. @ $.70 = $24.50
$24.50 + $4 (for tolls) = $28.50

$30 - $28.50 = $1.50 Car is $1.50 less
Car is $1.50 less expensive

Bonus: $2.65 - $.75 = $1.90 (mileage charge)
$1.90 ÷ 38 = $.05 (mileage charge for each 1/10th of a mile)

Page A130 Quiz 3

1. a. .07 b. .38 c. .045

2. a. $.03 b. $.16

3. tax = $.57
$14.20 + $.57 = $14.77

4. 3 - pennies
1 - nickel
1 - dime
2 - quarters
4 - $1 bills
1 - $5 bill

5.

Item Price	Estimate	Running Total
$ .43	$ .50	$ .50
1.37	1.40	1.90
3.92	4.00	5.90
.61	.70	6.60
	Tax	.24
		$6.84

Pages A131 - A132 Unit Test

1. 20 oz. for $.87 (cost per ounce = 4.35¢; cost per ounce for 12 oz. = 5¢)

2. 300 mi ÷ 15 mpg = 20 gal.
20 gal x 58¢/gal = $11.60

3. a. .27 x $9800 = $2646

b. $2646 ÷ 12 = $220.50

4. a. $1.00
.40
.40
$1.80

b. 5¢

5. 1.75
1.98
.40
.74
.45
5.32
.21 or .22
5.53 or $5.54

6. a. 8 x 5 x 8 x $2.90 = $928.00

b. uniform: 8 x $4 = $32.00
bus fare: 50¢ x 10 rides/wk x 8 wks = $40

$32 + $40 = $72.00

7. 60¢

8. 4 - pennies
1 - dime
1 - quarter
1 - $1 bill
1 - $5 bill

9. $850 x .04 = $34.00

10. # students = 2 x 60 + 80 = 200
cost for buses = $180 x 3 = $540
student cost = $540 ÷ 200 = $2.70

MASTERS FOR WORKSHEETS AND TRANSPARENCIES

Statistics

Letter Tally

LETTER	TALLY OF LETTER	FREQUENCY
A		
B		
C		
D		
E		
F		
G		
H		
I		
J		
K		
L		
M		
N		
O		
P		
Q		
R		
S		
T		
U		
V		
W		
X		
Y		
Z		

Statistics

Alphabet Numbers

Name _____

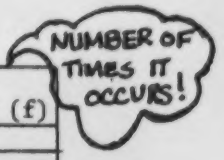
Date _____

Some letters of the alphabet occur more often than others in the English language. For example, the letter "e" was used 11 times in the first sentence and the letter "f" was only used twice.

To find out which letters occur most often, make a frequency table by following these directions:

a. Read the paragraph below the frequency table.

b. Make a tally of the letters occurring in this paragraph. (The first word, "If", has been tallied for you.)



LETTER	TALLY OF LETTERS	FREQUENCY (f)
A		
B		
C		
D		
E		
F	I	
G		
H		
I	I	
J		
K		
L		
M		
N		
O		
P		
Q		
R		
S		
T		
U		
V		
W		
X		
Y		
Z		

"If you awoke one day to discover that you had been put on a strange island, your first project after getting food and water would be to try to find out where you were. This is just what has happened to all of us. We have all been born on an island in space: the earth. We are all passengers on a cosmic journey. Astronomy is the process of finding out where we are."*

1. What are the five most frequently occurring letters? _____

2. What are the five least frequently occurring letters? _____

* Hartman, W. J. Astronomy: the Cosmic Journey. Belmont, California: Wadsworth, 1978, p. 2.

Statistics

Cryptic Code

Name_____

Date_____

According to studies done by cryptographers, the letter E is the most frequently used letter in the English language. Here is a list of all 26 letters in order from most frequently used to least frequently used:

E T A O N I R S H D L C U M F P Y W G B V K X J Q Z

How does this list compare to your results from the worksheet, Alphabet Numbers?

_____

Methods of statistics can be used to help in deciphering secret messages. This is of great importance to national security!

Use the information about frequency of letters used in the English language to solve the following cypher! Hints are given below.

C B K B N Z O K W C C B U G A V M Z

C I M L K M L P K C M O M U W

C M F K K L N W K E Z K C .

1. Make a frequency table for the letters used in this code. Which letter occurs most frequently? Is there a good chance this letter represents an E?

2. What are the only one-letter words in the English language? Does either of these words appear in the code?

3. A very common word in the English language is THE . Do you think it appears in this code?

4. What are some common two-letter words? Could any of these be in the cypher?

5. Keep in mind that ETAON are the five most frequently occurring letters in the alphabet. Some of the most frequently occurring letters in the code will probably match up!

6. GOOD LUCK!

Statistics

How Much Are You Worth?

A = $1	G = $7	M = $13	S = $19	
B = $2	H = $8	N = $14	T = $20	
C = $3	I = $9	O = $15	U = $21	Y = $25
D = $4	J = $10	P = $16	V = $22	Z = $26
E = $5	K = $11	Q = $17	W = $23	
F = $6	L = $12	R = $18	X = $24	

S	—	$19
U	—	$21
S	—	$19
A	—	$ 1
N	—	$14
W	—	$23
O	—	$15
N	—	$14
G	—	$ 7
		$133

Statistics

Value Tally

VALUE	TALLY	FREQUENCY

Statistics

Weighty Numbers

Name _____

Date _____

1. Thirty ninth grade students reported to the health office to have their heights and weights determined and recorded on their school records. The weight (in pounds) of the students are listed below:

91	121	93	99	115	112
105	95	135	100	98	123
78	98	85	123	101	88
83	92	81	75	79	81
117	69	103	90	87	94

The lightest student weighs _____ and the heaviest student weighs _____. This information is used to determine the intervals on a frequency table.

Complete the frequency table using the data above.

Weight	Tally	Frequency
60 - 69		
70 - 79		
80 - 89		
90 - 99		
100 - 109		
110 - 119		
120 - 129		
130 - 139		
	TOTAL	

2. The weights of these same students are given below in kilograms.

41	55	42	45	52	51
48	43	61	45	45	56
35	45	39	56	46	40
38	42	37	34	36	37
53	31	47	41	40	43

The lightest student weighs _____ and the heaviest student weighs _____ kilograms. Use this information to complete the frequency table below.

Weight	Tally	Frequency
30 - 34		
35 -		
	70 TOTAL	

Statistics

Name _____

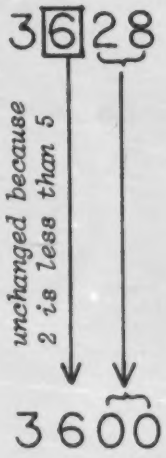
Rounding

Date _____

There are many times when total accuracy is not necessary. For example, instead of saying "I spent $29.57 at the store", one might round the amount to the nearest dollar and say "I spent $30 at the store." A newspaper might describe Mercury's period of revolution as 88 days instead of 87.9686 days.

When rounding numbers, you must decide how accurate an answer is desired. Should the number be rounded to the nearest ten? hundred? million?

Example: Round 3628 to the nearest hundred.



1) Find the number in the hundred's place.

2) Look at the number directly to the right of hundred's place:

   a) If it is 5 or more, increase the number in the hundred's place by 1.

   b) If it is less than 5, leave the number in the hundred's place unchanged.

   c) Change all numbers to the right of the hundred's place to zeroes.

1. In the year ending January 29, 1972, J.C. Penney and Company, Inc. sold $4,812,238,548 worth of merchandise.

4	8	1	2	2	3	8	5	4	8
billions	hundred millions	ten millions	millions	hundred thousands	ten thousands	thousands	hundreds	tens	ones

Use the chart above to help round that amount to the nearest:

a. ten _____

b. million _____

c. thousand _____

d. billion _____

e. hundred thousand _____

Table 49.—EXPENDITURES, AVERAGE SALARIES, AND DAYS OF SCHOOL, FOR PUBLIC ELEMENTARY AND SECONDARY EDUCATION: 1959-1960 TO 1975-1976

Fiscal year	Expenditures (dollars)		Cost per pupil[1] (dollars)	Average annual salary of teachers (dollars)	Number of days of school
	Current operations	Capital outlay			
1959-1960	46,641,819	6,439,864	332.37	5,802	168
1964-1965	69,119,765	18,643,073	435.29	6,060	169
1969-1970	146,753,192	37,564,333	818.19	9,591	179
1970-1971	179,070,294	34,539,101	988.54	10,424	177½
1971-1972	183,830,422	35,269,593	1,007.10	10,459	178½
1972-1973	184,118,840	31,618,093	1,014.02	10,883	174
1973-1974	221,923,654	33,618,196	1,257.40	11,968	176
1974-1975	232,185,601	24,832,512	1,305.00	13,949	178
1975-1976	268,155,310	31,983,000	1,503.39	15,111	178

[1] Based on average daily membership.
Source: Hawaii State Department of Education, records.

Table 229.—POSTAL SERVICE: 1966 TO 1976

Year	Number of post offices[1]	Gross postal receipts[2] ($1,000)	Pieces of mail handled[2] (millions)
1966	80	14,984	147
1967	80	15,881	149
1968	80	17,617	159
1969	80	20,178	172
1970	80	20,840	187
1971	80	21,976	201
1972	78	23,434	215
1973	77	27,100	226
1974	76	29,663	233
1975	76	33,549	238
1976	76	37,433	242

[1] As of June 30. Includes all 1st-, 2nd-, 3rd- and 4th-class post offices; excludes branches and stations.
[2] Years ended June 30.
Source: *Annual Report of the Postmaster General* for 1966-1970, *Statistical Abstract of the United States* for 1966-1971; U.S. Postal Service, Honolulu, records

Table 54.—YEARS OF SCHOOL COMPLETED BY PERSONS 25 YEARS OLD AND OVER BY AGE AND SEX: SPRING 1976

(Excludes persons in institutions or military barracks or on Niihau. Based on a sample of 38,818 persons, including those under 25

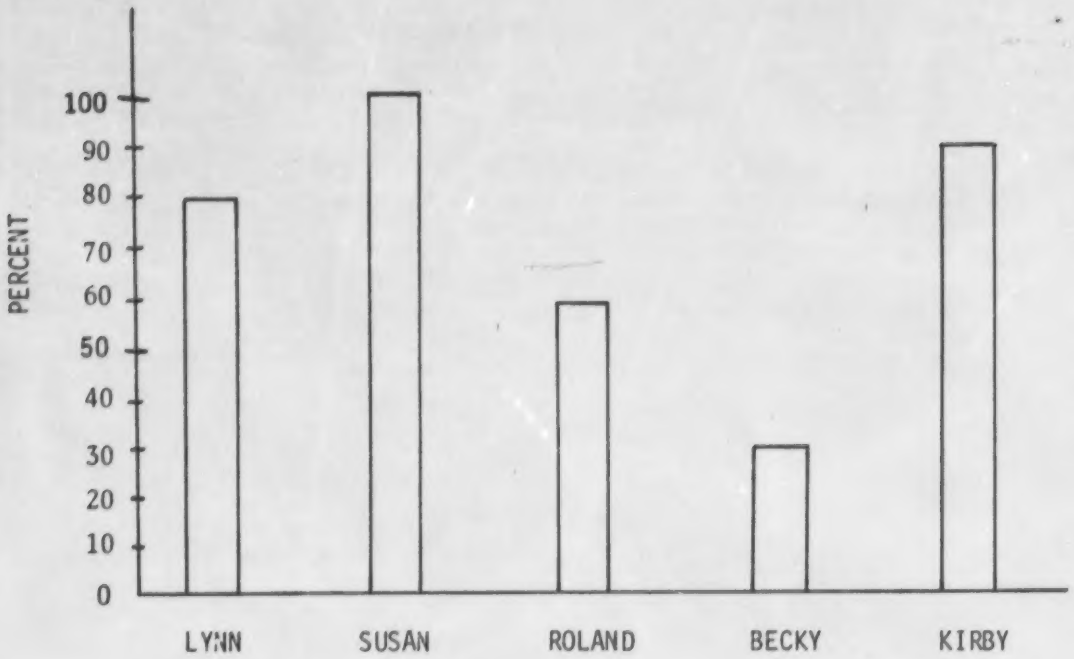
Years of school completed	Total, 25 and over	Sex		Age			
		Male	Female	25 to 39 years	40 to 59 years	60 years and over	Age not rptd.
All levels	460,354	230,313	230,041	195,011	175,563	80,321	9,459
None	3,861	2,058	1,803	354	700	2,739	68
1 to 4	13,718		6,424	1,365	4,008	8,192	153
5 to 8	47,048	21,806	25,242	6,726	18,597	21,297	428
9 to 11	36,943	17,524	19,419	11,038		6,460	510
12 and equivalent	130,292	60,295	69,997	57,699	53,265	16,063	3,265
Vocational	127,983	67,888	60,095	61,570	48,808	14,745	2,860
13 to 15	20,677	10,550	10,127	12,355	5,419	2,527	376
16	45,088	23,952	21,136	25,667	13,978	4,392	1,051
17 or more	34,744	18,946	15,798	18,237	11,853	3,906	748

Source: Hawaii State Department of Health, unpublished tabulations from the Hawaii Health Surveillance Program survey.

PINEAPPLES PICKED BY TEAM 2

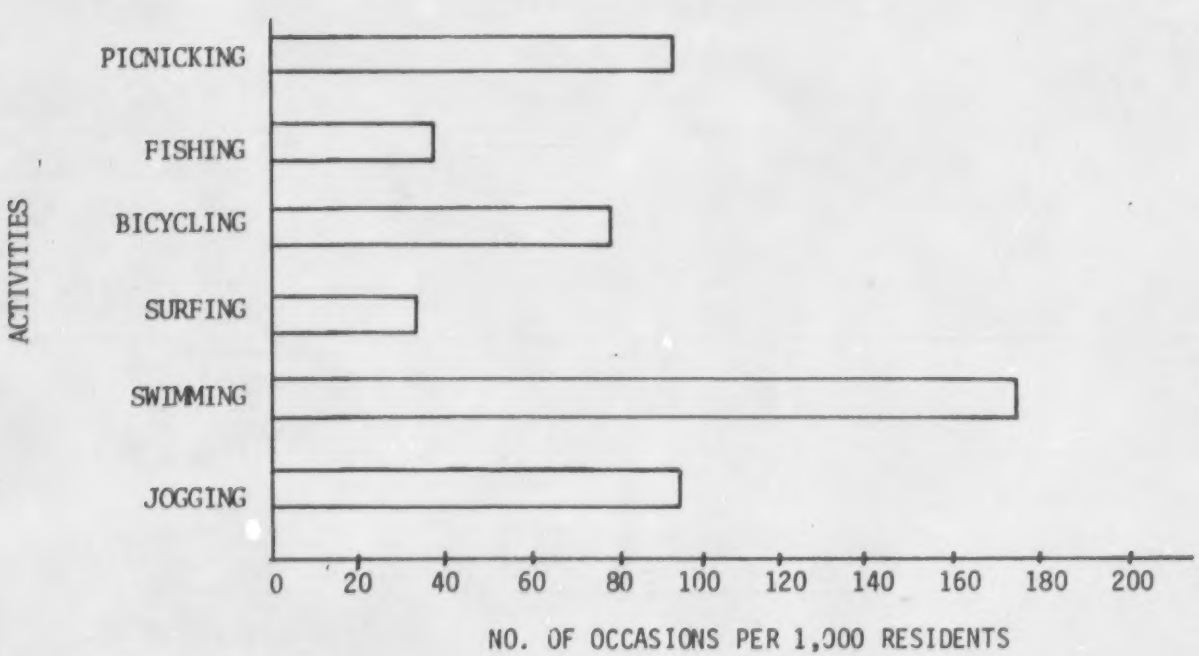
MONDAY	
TUESDAY	
WEDNESDAY	
THURSDAY	
FRIDAY	

KEY: = 5 TRUCKLOADS



MATH TEST RESULTS

WEEKEND PARTICIPATION
IN RECREATIONAL ACTIVITIES - 1975



Statistics
Bar-ring Hawaii

Name _____

1. This table shows the average occupancy rate for hotels in Waikiki during different years. For example, in 1974 the hotels had an average of 82.4% of their rooms occupied during the year.

   Make a bar graph to display this information.

   Be sure to - label each axis

   - label the graph

   - include numbers on your scale

AVERAGE HOTEL OCCUPANCY IN WAIKIKI	
YEAR	PERCENT
1971	58.9
1972	70.0
1973	81.5
1974	82.4
1975	78.3
1976	82.6

2. This table shows the 1978 breakdown of Hawaii's population by ethnic groups.

   Make a bar graph to display this information.

HAWAII'S POPULATION	
ETHNIC GROUP	PERCENTAGE
CAUCASIAN	28
JAPANESE	27
FILIPINO	10
HAWAIIAN / PART HAWAIIAN	18
CHINESE	4
KOREAN	1
SAMOAN	.5
OTHERS	11.5

77

3. This table shows the number of <u>millions</u> of pieces of mail handled by post offices in Hawaii.

PIECES OF MAIL HANDLED IN HAWAII	
YEAR	NO. OF MILLIONS OF PIECES
1968	159
1969	172
1970	187
1971	201
1972	215
1973	226

Since the smallest amount of mail handled on this table is 159 million, a piece of the scale should be cut out by using the symbol ≈ or ≋.

The bars must also be broken to indicate the jump in scale.

The graph has been started for you. Complete the graph and remember to label each axis as well as the graph itself.

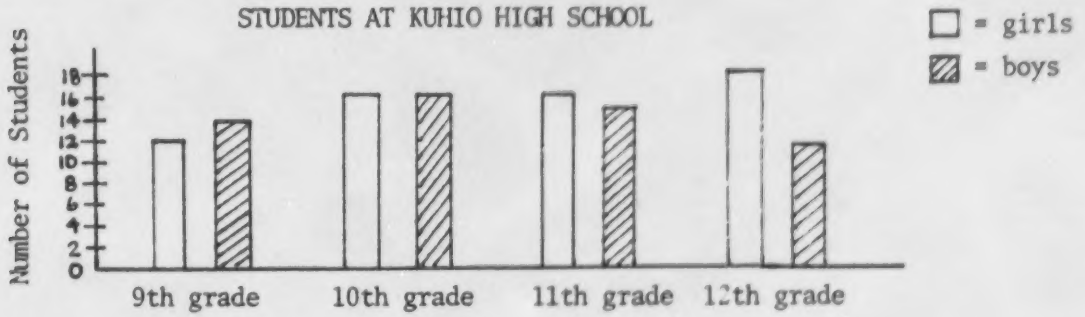
Statistics

Name _____

Double Vision

Date _____

More than one type of comparison can be done on a single graph.

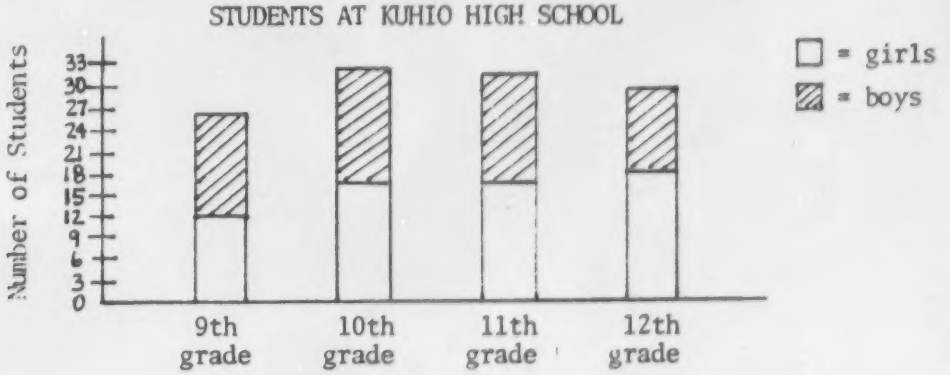


Using this graph it is easy to compare

--number of girls to number of boys within one grade.
--number of boys in each grade.
--number of girls in each grade.

The number of students in each grade can be compared, but that information cannot be read directly from the graph. (There are 26 students in grade 9; 12 girls and 14 boys = 26 students.)

The bar graph below displays this same data in another way:

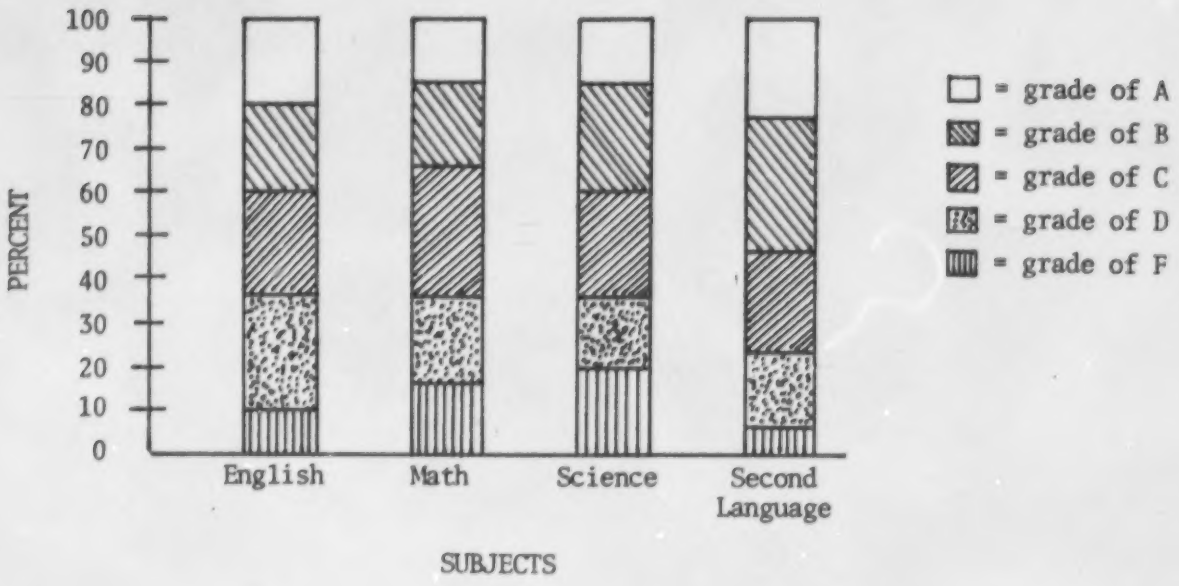


In this graph it is easier to compare the total number of students than it is to compare the number of 9th grade boys to the number of 11th grade boys.

To determine the number of 9th grade boys, think:

The graph indicates there are a total of 26 students in the 9th grade. The unshaded part starts at 0 and goes to 12, so there are 12 girls. 26 - 12 = 14 so there are 14 boys in the 9th grade.

DISTRIBUTION OF GRADES AT KUHIO HIGH SCHOOL IN 1978-79



Use the above graph to answer the following questions:

1. What percent of students received a B in science?

2. What percent of students received a C or lower grade in English?

3. What percent of students received at least a C in math? (C or better)

4. Did students receive a higher percent of A's in English or in a second language?

5. In which subject was the smallest percent of D's given?

*6. Did more students fail in science or in second language?

7. Why do all 4 bars on the graph go up to 100%?

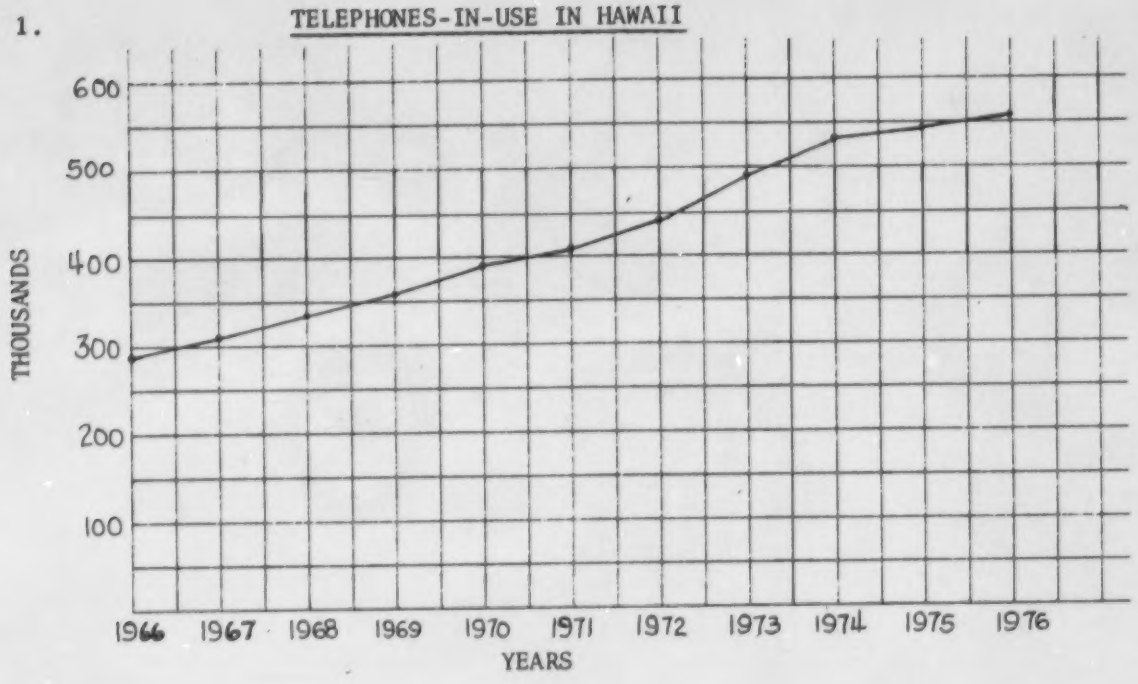
Statistics

Line Graphs

Name _____

Date _____

1.



a. How many phones were in use in Hawaii in 1971? _____

b. Were there more phones in use in 1966 or 1967? _____

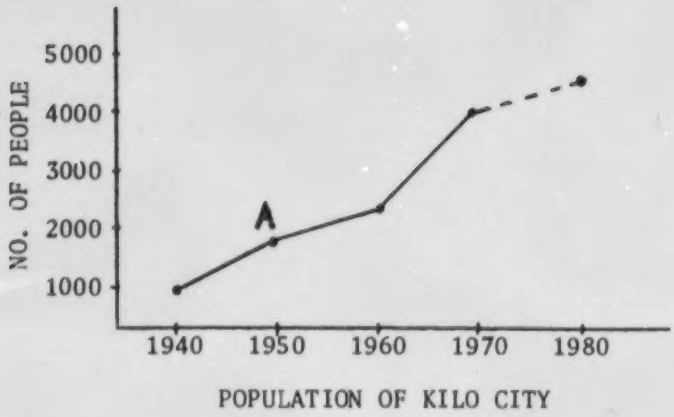
c. How many more phones were in use in 1975 than in 1970? _____

d. In what year were there about 390 thousand phones in use? _____

e. In what year were there almost half a million telephones in use? _____

f. Based on this graph, how many phone would you predict would be in use in 1977? _____

2.



a. What does point A represent?

_____

_____

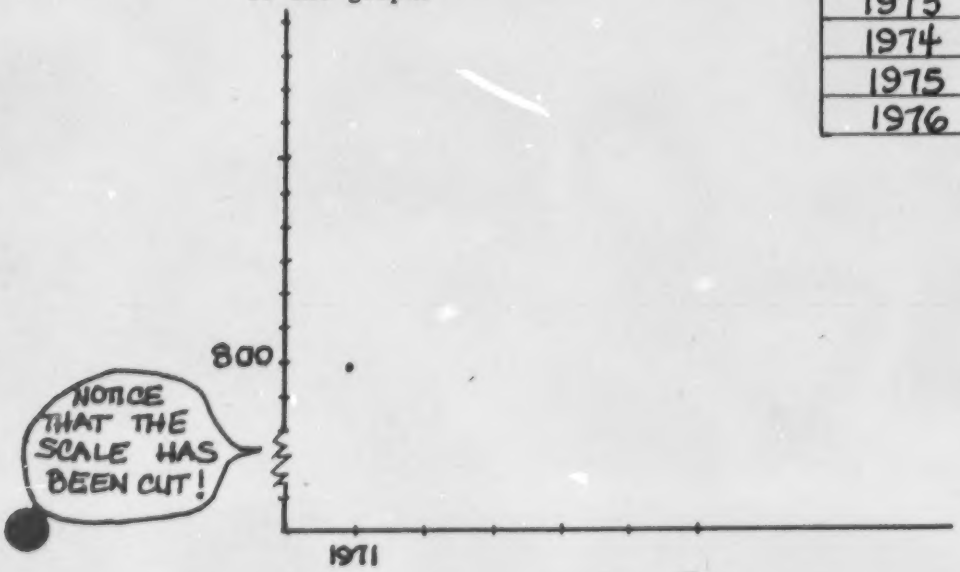
b. Why is there a dotted line on the graph? What does it represent?

_____

_____

3. Complete the line graph below using the information in the table. Be sure to complete the scales and label each axis. Also, give a title to the graph.

RESIDENT POPULATION IN HAWAII	
YEAR	THOUSANDS
1971	798
1972	820.9
1973	844.1
1974	854.1
1975	868.4
1976	886.6



4. The table at the right shows the balance in Thalia's savings account at the end of each month. Make a line graph to display the information.

THALIA'S SAVINGS ACCOUNT	
MONTH	BALANCE
SEPTEMBER	$30
OCTOBER	$50
NOVEMBER	$75
DECEMBER	$20
JANUARY	$30
FEBRUARY	$55
MARCH	$70

Statistics

Name _____

Percent Review

Date _____

1. Write each of these percents as a decimal. The first one is done for you.

a. 7% = .07

b. 38% = _____

c. 75% = _____

d. 19% = _____

e. 53% = _____

f. 2% = _____

g. 12.5% = _____

h. 100% = _____

i. ½% = _____

HINT: Your answer should be smaller than 1% or .01

2. To find 25% of 136 think:

25% = .25

therefore, 25% of 136 = .25 x 136

= 34

136
x .25
680
272
34.00

Find each of the following:

a. 36% of 250 =

b. 20% of 35 =

c. 5% of 160 =

d. 75% of 40.4 =

e. 12½% of 220 =

f. 200% of 38 =

3. 1825 customers shopped at the Hilo Supermart today. 20% of the customers bought cola. How many people bought cola?

4. Keala was supposed to work for 8 weeks during the summer. Each week he was scheduled to work 6 hours on Monday, 3½ hours on Tuesday, and 8 hours each on Wednesday, Friday, and Saturday.

a. What is the total number of hours Keala was scheduled to work during the summer?

b. Due to illness, he only worked 85% of the time. How many hours did he actually work?

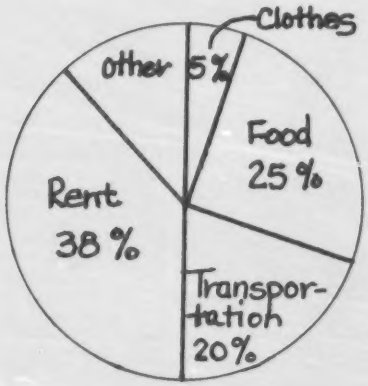
Statistics

Name _____

The Budget Circle

Date _____

Mr. and Mrs. Sato made a circle graph of their monthly income. It is shown below.



1. What percent of their income is spent on:

   a. Food? _____

   b. Rent? _____

   c. Clothes? _____

   d. Transportation? _____

2. They forgot to fill in the percentage spent on "other". What percent should be filled in?

3. How much money is spent on food each month? _____

4. You should have found that there is not enough information to answer question number three. In addition to knowing the percentage spent on each item in the Sato's budget, you need to know their monthly income. If their monthly income is $1600, determine the amount spent on each item. The first one is done for you.

   a. Amount spent on food = 25% of $1600 = .25 x $1600 = $400.

   b. Amount spent on transportation =

   c. Amount spent on rent =

   d. Amount spent on clothes =

   e. Amount spent on "other" =

5. Check your work in number four.

	Rent	=
	Clothes	=
	Food	= $400
	Transportation	=
+	"other"	=

Does your total make sense?

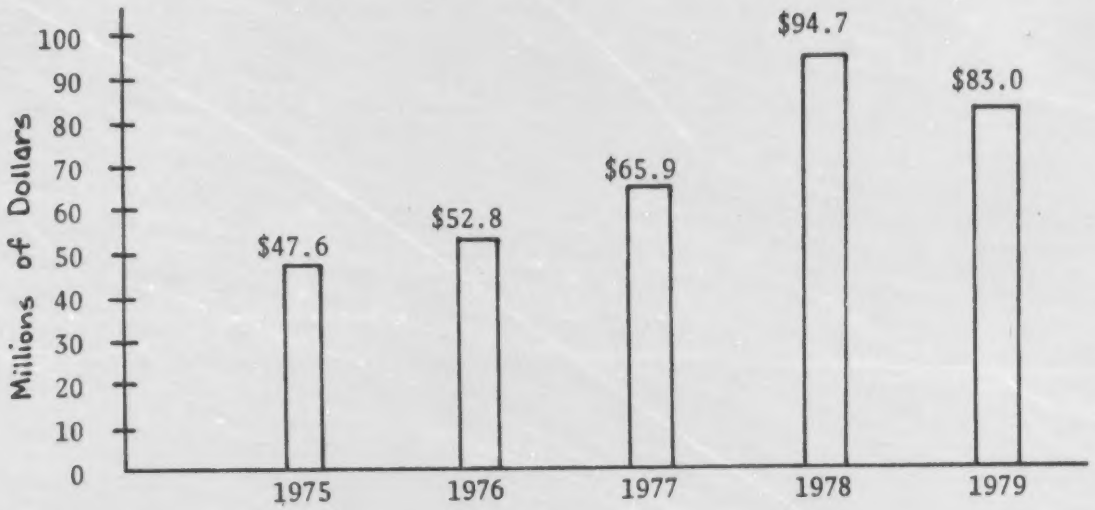
Statistics

Name_____

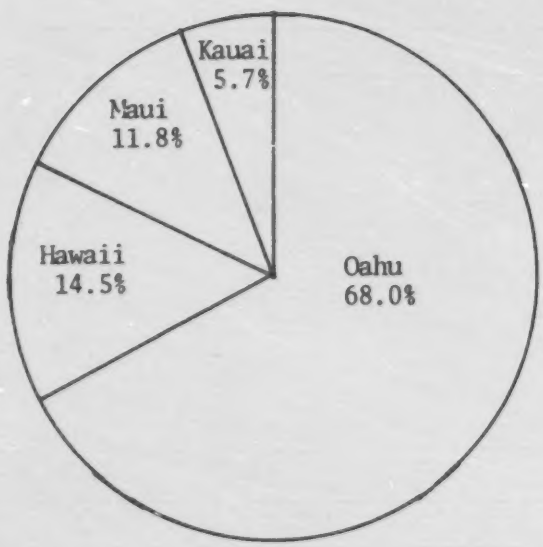
Constructing Information

Date_____

The following graphs appeared in the March 1979 "Isle-Tone" (a Hawaiian Telephone brochure).



HAWAIIAN TELEPHONE'S CONSTRUCTION BUDGET



1979 CONSTRUCTION BUDGET
BY COUNTIES

1. Which graph is used to compare yearly budgets?

2. Place a check mark (✓) next to the questions that can be answered using one or both of the graphs.

   _____ a. How much money did Hawaiian Telephone spend on construction in 1977?

   _____ b. Did they spend more money on construction in 1978 or in 1974?

   _____ c. Will the budget in 1980 be more or less than $83 million?

   _____ d. In 1977, was more money spent for construction on Maui or Kauai?

   _____ e. In 1979, how much money was spent for construction on Oahu?

3. The circle graph shows how Hawaiian Telephone intends to spend the money from their 1979 budget. The total amount of money they have to spend is _____.

   a. 11.8% of that money will be spent on Maui. How much money is that?

   b. How much money will they spend on construction on the Big Island?

   c. How much more money will be spent on construction on Oahu than on Kauai?

   d. Suppose the entire amount budgeted for 1979 is spent evenly throughout the year. How much money will Hawaiian Telephone spend on construction each week?

   e. How much will they spend each day? (See d. above)

   f. 4% of the entire 1979 budget will be used for tools, vehicles, etc. How much money is this?

   g. To provide for anticipated growth in demand for service approximately 78% of the money will be used. How much is this?

Statistics

Working with Fractions

Name _____

Date _____

1. Simplify each of the following fractions. (Remember: a fraction can be simplified when both the numerator and denominator can be divided by the same number!)

$\frac{24}{36}$ (both can be divided by 2) = $\frac{12}{18}$ (both can be divided by 6) = $\frac{2}{3}$

a. $\frac{9}{12}$ =

b. $\frac{15}{35}$ =

c. $\frac{120}{300}$ =

d. $\frac{75}{250}$ =

e. $\frac{18}{42}$ =

f. $\frac{36}{72}$ =

g. $\frac{16}{80}$ =

h. $\frac{1080}{1296}$ =

To change a fraction into a percent:

a) first find its decimal value. (Remember: $\frac{3}{4}$ means $3 \div 4$ or $4\overline{)3}$)

$$4\overline{)3.00} = .75 \quad \text{so, } \frac{3}{4} = .75$$

(28, 20, 20)

b) then change the decimal into a percent.

$.75 = 75\%$ so, $\frac{3}{4} = .75 = 75\%$

2. Write each of the following fractions first as a decimal and then as a percent.

a. $\frac{1}{2}$ = _____ = _____

b. $\frac{7}{10}$ = _____ = _____

c. $\frac{2}{5}$ = _____ = _____

d. $\frac{1}{8}$ = _____ = _____

e. $\frac{24}{96}$ = _____ = _____

f. $\frac{3}{16}$ = _____ = _____

*g. $\frac{5}{6}$ = _____ = _____

*h. $\frac{5}{4}$ = _____ = _____

3. Simplify each of the following.

a. $\frac{3}{4} \times 48 =$

Think: $48 = \frac{48}{1}$

b. $\frac{2}{3} \times 60 =$

c. $\frac{7}{8} \times 24 =$

d. $\frac{6}{9} \times 15 =$

e. $\frac{8}{10} \times 30 =$

*f. $\frac{10}{24} \times 180 =$

Statistics

Name _____

Circle Graphs - Step by Step

Date _____

The 11th grade class has the following breakdown:

Japanese	20 students
Chinese	6 students
Samoan	4 students
Filipino	6 students
Caucasian	12 students
TOTAL	48 students

To make a circle graph of this information an angle measurement must be determined. Every circle has a total of 360°.

a) 20 out of 48 students are Japanese. Therefore, $\frac{20}{48}$ of the circle should represent these students. The angle measurement must be $\frac{20}{48} \times 360° = 150°$

b) Find the angle measurement on the circle graph for the Chinese students.

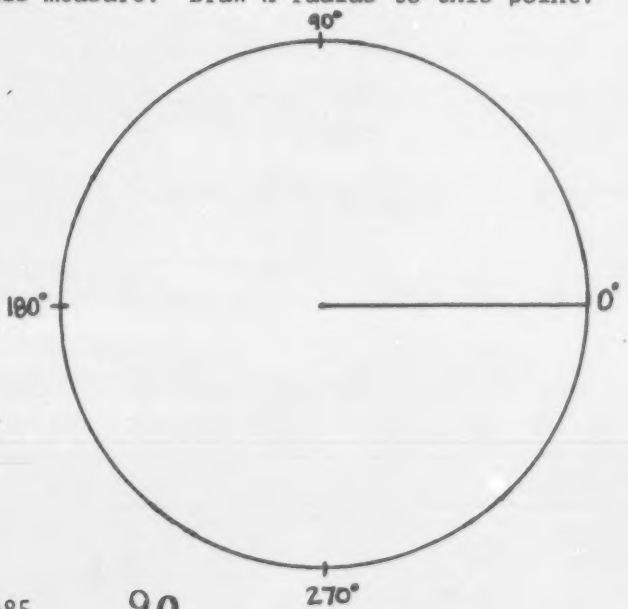
c) What is the angle measurement for the Samoans, Filipinos, and Caucasians?

Use the circle below to make a graph of this information.

d) The angle for the Japanese students should measure 150°. Find 150° and draw a radius. Label the section.

e) The angle for the Chinese students should measure _____°. From 150° to _____° will give an angle of this measure. Draw a radius to this point. Be sure to label.

f) Complete the graph.
Write a title for the graph.
Determine the percent of total students that each section represents and fill this in on the graph. (Example: Chinese students = $\frac{6}{48} = \frac{1}{8} = .125 = 12.5\%$)



Statistics

Circling Your Day

Name _____

Date _____

The table below shows how Todd spent his day last Tuesday.

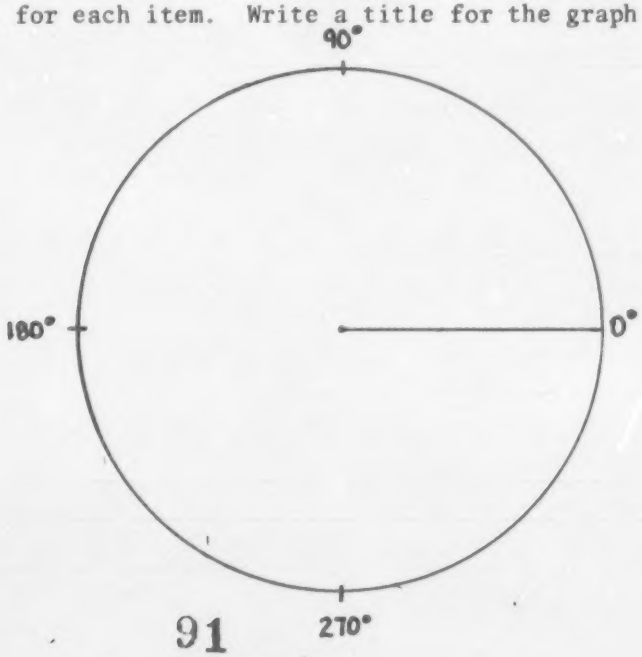
Activity	No. of Hours	Part of Whole Day	Central Angle Measurement
Sleeping	8	$\frac{8}{24} = \frac{1}{3}$	$\frac{1}{3} \times 360° = \frac{360}{3} = 120°$
School	6		
Eating	2		
Homework	1		
After School Sports	3		
Miscellaneous	4		
Total	24		

Total should be $\frac{24}{24}$ or 1

Total angle measurements should be 360°

1. Complete the table by finding what part of the day each activity took and by finding the central angle measurement.

2. Use the central angle measurement you found to complete the circle graph below. Be sure to label each part of the circle and write the percent for each item. Write a title for the graph.



Statistics

Unit Review

Name _____

Date _____

The following questions were asked in a recent survey:

a. How old are you?

b. How long have you lived in Hawaii?

c. Do you watch television often?

d. Do you agree that The Muppets is one of the best shows on T.V.?

e. What shows did you watch on Monday night?

f. What are your three favorite shows?

g. Does it matter to you that there is a one-week delay for most programs from the mainland?

h. How could television programming be improved?

1. Which of the above questions should have been answered with facts? _____

2. Which questions asked for an opinion? _____

3. Which question is too vague (in other words, which question is not specific enough)? _____

   Reword the question to improve it:

   _____

   _____

4. Which of the questions is biased? _____

   Reword the question:

   _____

   _____

5. 3.14159265358979323846264338327950288...is an irrational number. It is called pī and is usually represented by the symbol π. Make a frequency table for the first 35 numbers that appear after the decimal point in the number.

6.

TABLE 227. - PROPRIETORSHIPS: 1961 TO 1973

Year earned	Number of businesses			Net profit or loss ($1,000,000)	
	Total	With net profit	With net loss	Profit	Loss
1961	22,316	19,084	3,232	70.9	4.3
1963	23,470	19,619	3,851	78.5	6.3
1965	22,366	19,150	3,216	91.0	5.1
1967	24,325	20,190	4,135	93.4	8.6
1969	25,730	20,853	4,877	129.5	9.6
1971		21,886	7,712	138.5	13.9
1973	33,143	24,817	8,326	163.3	19.4

Source: Hawaii State Department of Taxation, Hawaii Income Patterns - Proprietorships (biennual report).

a. How many businesses made a profit in 1969? _____

b. How much money did businesses lose in 1963? _____

c. Were there more businesses with a net profit in 1965 or in 1963? _____

d. How many more companies had a net loss in 1967 than in 1961? _____

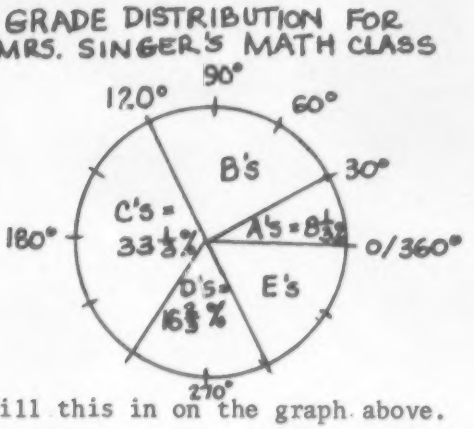
e. What was the total number of businesses in 1971? _____

f. How much more profit did companies make in 1971 than in 1965? _____

7. a. What percent of students received A's? _____

b. Did Mrs. Singer give more D's or more E's? _____

c. What percent of grades were E's _____



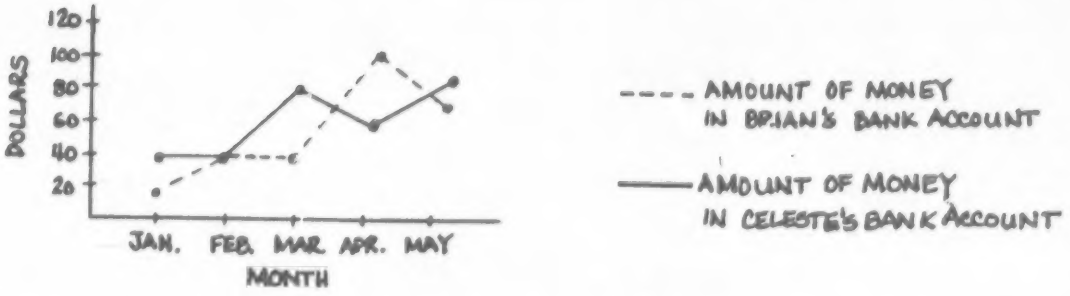
d. What percent of grades were B's? Fill this in on the graph above.

e. What is the sum of all the percent on the graph? _____

f. What percent of the students received either an A or a B? _____

g. If 48 students are in Mrs. Singers math class, how many students received received B's? _____

8.



a. In March. who had more money in a bank account, Brian or Celeste? _____

b. In which month did Brian and Celeste have the same amount of money in their bank accounts? _____

c. In how many months did Celeste's account have more money than Brian's? _____

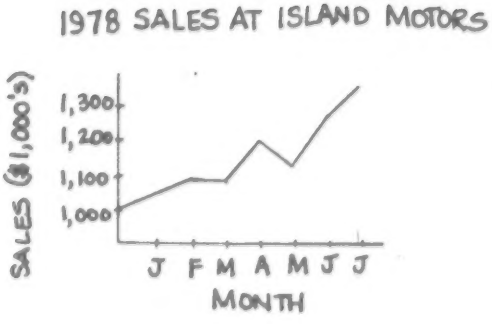
d. In April, how much more money did Brian have in his account than Celeste have in hers? _____

9. Display this information on a bar graph. Be sure to label your graph and the axes.

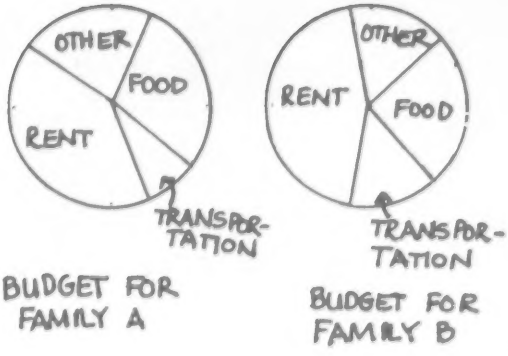
STUDENTS AT ALII HIGH SCHOOL	
GRADE	# OF STUDENTS
9	100
10	106
11	98
12	103

10. What is misleading about each of the following graphs or statements?

a.



b.



c. "Since I started using 'Pest-Control' I haven't seen any roaches in my apartment."

Consumer Mathematics

Name _____

Pre-Test

Date _____

Directions: Read all of the problems carefully before you begin. Then solve the problems as instructed.

1. Find the sum of the numbers 1, 2, 3, 4, . . . 20. 1. _____

2. Multiply: 784.1 x .36 2. _____

3. Pick a number. Multiply by 2. Add 4. Divide by 2. Subtract your original number. What do you get? 3. _____

4. How many minutes are there in 31 days? 4. _____

5. $376\overline{)43782.417}$ 5. _____

6. Paul bought 3 rolls of paper towels for $2.37. How much did each roll cost? 6. _____

7. $\frac{128}{32} \div \frac{44}{16} = ?$ 7. _____

8. How many pencils are there in 53 boxes if there are 15 pencils in each box? 8. _____

9. Now that you have read all the problems, do only problem number three. Turn your paper over, write your name on the blackboard and then sit quietly! 9. _____

Consumer Mathematics

Name_____

Identifying Facts

Date_____

Directions: Read the problem in the box on the left. Then circle the answer to the question asked on the right.

1. Carol's car gets 15 m.p.g. and she just bought 6 gallons of gas. Each gallon cost $.69. Does she have enough gas to drive 120 miles?	How much gas did Carol buy? a. 15 gallons b. 6 gallons c. 69 gallons d. problem doesn't say
2. The charge for a 3 minute inter-island telephone call is 90¢ between 6 a.m. and 5 p.m. From 5 p.m. to 8:30 p.m. it costs 75¢. Is it less expensive to call Friday at 6 p.m. or Monday at 5 p.m.?	When does a call cost 75¢? a. Weekends b. 6 a.m. - 5 p.m. c. 5 p.m. - 8:30 p.m. d. 8:30 p.m. - 6 a.m.
3. A plane leaves Honolulu at 5:14 p.m. and arrives in San Francisco at 11:32 p.m. How long is the flight?	When is the plane at the Los Angeles airport? a. 5:14 b. 11:32 c. never d. problem doesn't say
4. In March the water at Waikiki Beach averages 75° F in the morning and 77°F in the afternoon. In August, the average temperatures are 77°F and 82°F respectively. When is the average water temperature the highest?	What is the average afternoon water temperature in August? a. 75°F b. 77°F c. 82°F d. problem doesn't say
5. Mrs. Sakai has a carton of pencils. There are 12 boxes in the carton and each box has 15 pencils in it. She also has 6 boxes of pens with 10 pens in each box. Does she have enough pencils for 150 students?	How many pencils are in each box? a. 12 b. 15 c. 6 d. 10

6. PAC-3 has played 7 basketball games so far this season. They have won 4 games. There are 12 games remaining. How many of these must PAC-3 win so they will win at least 70% of all their games?

How many games have they won?
a. 7
b. 12
c. 4
d. 70%

7. 15 people on Lanai have pet birds. 130 people have cats. 24% more people have dogs than cats. Pet birds and fish are equally popular. How many more people have dogs than fish?

How many people have pet rabbits?
a. 15
b. 130
c. 24
d. problem doesn't say

8. State Population

Age	State total		
	Both sexes	Male	Female
Under 18 years	275,194	140,910	134,284
62 years and over ..	56,955	29,763	27,192
65 years and over ..	44,043	22,255	21,788

What does the number 44,043 represent?
a. Male & Female, 65 yrs. and over
b. Male, 62 yrs, and over
c. Male & Female, 62 yrs. and over
d. Male, 65 yrs. and over

*9. What is the regular price of the least expensive muu's?

What does the amount $8.79 represent?
a. regular price
b. 20% of regular price
c. 80% of regular price
d. None of the above

Consumer Mathematics

Name_____

Identifying New Information

Date_____

Directions: Read the problem in the box on the left. Then circle the answer to the question asked on the right.

1. Mrs. Aihara made 3 dozen cookies and Betty made 4 dozen. Ken made the same amount of cookies as Mrs. Aihara. How many cookies did they make altogether?	How many cookies did Ken make? a. 3 dozen b. 4 dozen c. 6 dozen d. problem doesn't say
2. There are fewer students enrolled at U.H. this year than last year. There are 3000 students taking math classes this year. Last year 3500 students took math. How many more students took math last year?	How many students are enrolled at U.H. this year? a. 3000 b. 3500 c. 500 d. problem doesn't say
3. Jon is 18 years old today. He has a 17 year old sister and a brother who is 3 years older than his sister. What is the sum of their ages?	How old is Jon's brother? a. 13 b. 3 c. 17 d. 20
4. Mary works part-time at a snackbar three days a week. She gets paid $3/hour. Her hours are: M: 3-5, W: 3-6, and Sat: 10-3. What is her weekly salary?	How many hours does Mary work on Wednesday? a. 4 b. 3 c. 6 d. 11
5. Tim runs 1-1/2 times faster than Bob. Allen can run twice as fast as Tim. If Bob can run 1 mile in 15 minutes, how long will it take Allen to run 1 mile?	Who is the fastest runner? a. Tim b. Allen c. Bob d. Not enough information

6. Which is a better buy? 6 bottles of Coke for $1.80 or 4 bottles of Pepsi for $1.20? (The bottles are the same size.)	How much does one bottle of Coke cost? a. $1.80 ÷ 6 = $.30 b. $1.80 x 6 = $10.80 c. $1.20 ÷ 4 = $.30 d. $1.20 x 4 = $4.80
7. Roger is going to the mainland on vacation. He expects to drive 1000 miles. His car averages 20 m.p.g. and gas costs $.70/gallon. How much will gas cost for his trip?	How many gallons of gas will Roger need? a. 1000 ÷ 20 b. 1000 x 20 c. 1000 x $.70 d. 20 x $.70
8. On the 1st of each month, paper products are ordered for a fast-food restaurant. They need to order 8,000 cups. If they pay 75¢ for a package of 200 cups, what will the total cost be?	How many packages of cups must they order? a. 75 x 200 b. 200 x 8000 c. 8000 ÷ 200 d. 8000 ÷ 75¢

Consumer Mathematics

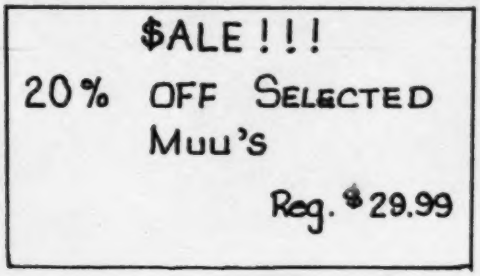
Name_____

Understanding Questions

Date_____

Directions: Read the problem in the box on the left. Then circle the answer to the question asked on the right.

1. April is traveling from Kaanapali to Hana, Maui. From Kahului to Hana is 83 km . It is 37 km from Lahaina to Kahului and 37 km from Kaanapali to Lahaina. How far will April have to travel?	What does the problem ask you to find? a. The distance from Hana to Lahaina b. The distance from Lahaina to Kahului c. The distance from Hana to Kaanapali d. None of the above
2. PAC-3 has played 7 basketball games so far this season. They have won 4 games. There are 12 games remaining. How many of these must PAC-3 win so they will win at least 70% of all their games?	What does the problem ask you to find? a. The total number of games PAC-3 must win b. The total number of games PAC-3 will play this season c. The number of remaining games PAC-3 must win d. The number of games PAC-3 can lose and still have a 70 - 30 record
3. On October 21, 15% of the students at Kanelua High School were absent. Of the remaining 485 students, 10% were on a field trip. How many students at K.H.S. did not go on a field trip that day?	What does the problem ask you to find? a. The percentage of students attending classes b. The number of students absent c. The number of students on the field trip d. The number of students attending class plus the number of students absent
4. The Hirata's spent $750 on food during the first 3 months of the year. If they continue to buy food at this rate, how much will they spend on food for the rest of the year?	What does the problem ask you to find? a. The amount spent for food in one year b. The amount spent for food in one month c. The amount spent for food in three months d. The amount spent for food in nine months

5. Audrey is making a circular table cloth. She wants to put fringe on the edge. The radius of the tablecloth is 1.5 meters. How much fringe should she buy?	What does the question ask you to find? a. The amount of surface on the tablecloth b. The distance around the edge of the tablecloth c. The diameter of the tablecloth d. The cost of the fringe
6. In 1966 there were 14,943 births in Hawaii. There were 14,765 births in 1967 and 14,595 in 1968. What is the average number of births for these 3 years?	What does the problem ask you to find? a. The total number of births b. The number of births x 3 c. The number of births ÷ 3 d. None of these
* 7.  What is the sale price?	What does the problem ask you to find? a. 20% of $29.99 b. 80% of $29.99 c. Don't need to find anything, $29.99 is the answer d. None of the above

Consumer Mathematics

Name _____

Using a List

Date _____

An organized list is often helpful in answering a question. Solve each of these problems using an organized list. Show your work on a separate sheet of paper.

1. How many three-digit numbers can be made using the digits 2, 4, and 1? (Each digit can be used only once.)

   2____ , 4____ , ____

   2____ , 4____ , ____

   How was this list organized? _____

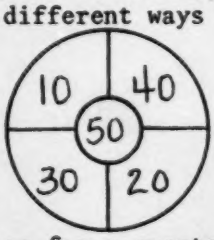
2. Anne wanted to know how many three-digit numbers can be made if each digit (2, 4, and 1) can be used more than once. Her class made an organized list of the numbers beginning with two. Complete the solution.

2	4	1
222		
221		
224		
211		
212		
214		
241		
242		
244		

3. How many three-digit numbers can be made using only the digits 5 and 3 (example: 535)? (Should there be more numbers or fewer numbers than in problem 2?)

4. Evans, Eric and Tom came in first, second and third in the 10,000 meter race, not necessarily in that order. How many different ways could they have won?

5. John throws three darts at the board shown on the right. How many different ways can he score 50 points? (Order doesn't matter.)



6. April works as a cashier. Mr. Marks wants change for a quarter. How many ways can April give Mr. Marks change?

7. Two couples, Joe and Gail, and Billy and Kim, went to the movies. Show how many ways they can be seated so that each boy sits next to his date and the four people sit in four consecutive seats.

8. In how many ways can 10 pennies be placed in three piles so that each pile has a different number of pennies?

*9. Mr. Lani is reading a book. 642 digits were used to number the pages. (Page 37 uses 2 of those digits, a three and a seven.) How many pages are there in his book?

Consumer Mathematics Name _____

Using A Table to Guess & Check Date _____

A table is often used to organize information in solving a problem. Use a table and the guess and check method to solve the following problems.

1. Find two numbers whose sum is 26 and whose product is 144.

SUM = 26

First number	2	4						
Second number	24	22						
Product	48	88						

2. One number is five times another number. Their sum is 72. Find the two numbers.

First number	2						
Second number	10						
Sum	12						

3. Mr. Tanner has a total of 42 cows and ducks which he raises. Altogether these animals have 132 feet. How many cows does Mr. Tanner have?

No. of cows							
No. of ducks							
No. of cow's feet							
No. of duck's feet							
Total No. of feet							

4. Hans collects nickels and dimes. He has twice as many dimes as nickels. These coins have a total value of $5.00. How many nickels does Hans have?

No. of nickels							
No. of dimes							
Value of nickels							
Value of dimes							
Total value of coins							

5. The Jr. Class sold 125 tickets to the class play. Adult tickets cost $1.50 and student tickets cost $1.00. They collected a total of $150.00. How many student tickets were sold?

Consumer Mathematics Name _____

Food for Thought Date _____

I. In each pair, circle the larger amount.

a. 13.6¢ 13.4¢ c. $.043 $$.039 e. 5.8888 6.111

b. 73.2¢ 73.18¢ d. 7.8351 6.9999 f. 2.1436 2.1426

II. Solve.

a. $2\overline{)\$1.53}$ b. $3\overline{)78¢}$ c. $12\overline{)63}$ d. $50\overline{)35.}$

III. These questions refer to problems 8 and 10 on page 7 of your book.

8. a. Name the two places Carl can buy a quarter-pounder.

b. What is the hidden cost of going to Sam's Hamburger Haven?

c. How far will Carl have to drive to get to the Haven and back?

d. If gas costs 3¢ per mile, how much will Carl pay for gas?

e. What is the total cost of buying the hamburger at the Haven?

f. Answer question (a) in the book.

g. Sam's burgers cost _____ and burgers at the drive-in cost _____. Therefore, Sam's burgers are _____ less expensive.

h. Since it costs 90¢ for gas to go to Sam's, how many hamburgers would Carl have to buy to save at least the cost of the gas?

i. Answer question (b) in the book.

10. a. If you wanted to eat five slices of pizza at Mr. Tony's Pizza Parlor, how much pizza would you have to order?

b. How much would this cost?

c. If you wanted to eat six slices, how much would you have to order? How much would it cost?

d. What if you wanted to eat seven pieces? Would one pizza be enough? How many would you have to order? What would the cost be?

e. What if you wanted eight slices?

f. Answer the question in the book.

Consumer Mathematics

Logic Table Transparency

TOSHI BOUGHT FIVE RECORD ALBUMS TO GIVE AS GIFTS TO MAINA, KENRICK, FRED, DONNA AND PAT. ONE IS A HOMEGROWN ALBUM; THE OTHERS ARE BY THE BEE-GEES, BROTHERS CAZIMERO, SHAUN CASSIDY AND ELVIS PRESLEY. (NO ONE WAS TO RECEIVE AN ALBUM THEY ALREADY HAD AND EVERYONE LIKED THE ALBUM THEY RECEIVED.) WHO RECEIVED WHICH ALBUM FROM TOSHI?

	BEE-GEES	HOMEGROWN	BROTHERS CAZIMERO	SHAUN CASSIDY	ELVIS PRESLEY
MAINA					
KENRICK					
FRED					
DONNA					
PAT					

A. KENRICK AND DONNA ALREADY HAVE THE HOMEGROWN ALBUM.

B. FRED AND THE PERSON WHO RECEIVED THE BEE-GEES ALBUM DON'T LIKE SHAUN CASSIDY.

C. MAINA RECEIVED THE ELVIS PRESLEY ALBUM.

D. TOSHI BOUGHT EITHER THE BEE-GEES OR THE SHAUN CASSIDY ALBUM FOR PAT.

E. DONNA RECEIVED AN ALBUM RECORDED BY A SINGLE ARTIST.

Consumer Mathematics Name_____

Logic Tables Worksheet Date_____

Directions: Enter all the information given by the clues in the table. Use an X to indicate a definite "no" and a dot to show a definite "yes". (Hint: Once you enter a definite "yes" (dot) you should place an X in all the remaining boxes in the row and column containing the dot.)

1. Who is the soccer player?

   a. Billy and the football player went snorkeling on Wednesday.

   b. Allen and Kirk went to the game on Thursday to watch the volleyball player.

   c. Kirk hates to play football.

   Use the following table to find the answer:

	soccer	volleyball	football
Billy			
Allen			
Kirk			

2. Mr. Engel, Mrs. Horiuchi, Ms. Sato and Mr. Miyashiro teach English, Math, Science and History, not necessarily in that order.

   a. No one teaches a subject that begins with the same letter as his/her name.

   b. Mr. Engel won't speak to the science teacher.

   c. Ms. Sato and the math teacher are good friends.

   d. Mrs. Horiuchi teaches either English or History.

   Who teaches which subject?

	English	History	Science	Math
Mr. Engel				
Mrs. Horiuchi				
Ms. Sato				
Mr. Miyashiro				

3. Tom, Dave, Marie, Carol and Bob all live on different floors of a condominium that has only five floors. Tell which floor each one lives on.

   a. Tom does not live on the top floor.

   b. Dave does not live on the bottom floor.

   c. Marie doesn't live on either the top or bottom floor.

   d. Bob lives on the 4th floor.

   e. Carol lives on a higher floor than Dave does.

   f. Bob does not live on a floor directly above or below Marie.

	Tom	Dave	Marie	Carol	Bob
5th floor					
4th floor					
3rd floor					
2nd floor					
1st floor					

4. Gloria, Evelyn, Linda and Annette make up a flight crew--pilot, co-pilot, navigator, and engineer--but not necessarily in that order.

   a. Linda had lunch with the co-pilot.

   b. Linda and Annette are married, Gloria and Evelyn are single.

   c. The engineer's husband is a passenger.

   d. Evelyn is going to school to become a pilot.

   e. Annette went to the movies with the engineer and her husband.

   f. The co-pilot, who is not Gloria, is engaged to be married.

   g. Annette is either the co-pilot or the navigator.

   Make a table!

Consumer Mathematics

Name _____

Using Known Facts

To solve a problem, you sometimes have to use facts that you already know. Every fact is not always stated.

Directions: Write the additional facts you need to use to solve each problem. The first one is done for you.

1. The pitcher holds 2 quarts of water. How many ounces of water does it hold?

   Need to know: *number of ounces in 1 quart (1 qt. = 32 oz.)*

2. Lauren weighed 7 lbs. 3 oz. when she was born. She now weighs 120 oz. How much weight has she gained?

   Need to know: _____

3. Mary is 5' 6" tall. Judy is 67" tall. Who is taller?

   Need to know: _____

4. Eric earns $15,000/year. What is his average monthly salary?

   Need to know: _____

5. Pam walked for 1½ hours today, 50 minutes yesterday and 1 hour and 15 minutes the day before. What is the total amount of time she has spent walking?

   Need to know: _____

6. Mr. Lani has 4 dozen pencils. He is giving a test to 60 students. Does he have enough pencils for the students?

   Need to know: _____

7. Jeff measured his living room for a carpet. It is 10 m long and 90 dm wide. How much carpet should he buy?

   Need to know: _____

Consumer Mathematics

Pizza Pains

Name _____

Date _____

I. The table below refers to problem 2 on page 14. Complete the table and then answer the question in the book.

ITEM	PACKAGE PRICE	UNIT PRICE	AMOUNT IN RECIPE	COST
oil	16 oz., 80¢		3 tbsp = ___ oz.	
onion			1 lg. onion = ___ lb	
green pepper				
meat				
water				
tomatoes				
tomato sauce				
chili powder				
salt				
bay leaves				
paprika				
cayenne				

II. These questions refer to problem 3 on page 15 of your book.

a. How many quarter-pounders can be made from one pound of hamburger?

b. How much would the meat alone cost for one hamburger?

c. How much would one hamburger bun cost?

d. Answer question (a) in your book.

e. How much would it cost Carla to make 5 hamburgers for one week?

f. How many weeks are there in one year?

g. How much would it cost Carla to make 5 hamburgers a week for one year?

h. Carla buys a quarter-pounder for _____¢ each day. How much does it cost to buy 5 quarter-pounders in one week?

i. How much does it cost to buy 5 of them every week for a year?

j. Answer question (b) in your book.

k. Answer question (c) in your book.

l. Can you think of another way to solve this problem?

Consumer Mathematics

Name _____

Simplify the Problem

Date _____

Directions: Simplify each problem by using numbers that make the problem easy for you to understand. Solve the problem using your numbers. Then use the same method to solve the original problem.

Example: Chocolate candy at Morrow's cost $2.69 (3) a pound. Thalia bought .75 (2) pounds. How much did she pay for the candy?	Simplified problem: $3 x 2 = $6.00 Actual problem: $2.69 x .75 = $2.02
1. Mrs. Tanner bought a 7.4 (○) pound roast for $18.87 (○). What was the cost of the roast per pound?	Simplified problem: Actual problem:
2. A stack of notebook paper 2¼ (○) feet tall contains 7200 (○) pieces of paper. How much paper will there be in a one foot stack?	Simplified problem: Actual problem:
3. It costs approximately $.075 (○) to travel one kilometer on a commercial plane. How much will a 3482 (○) km plane trip cost?	Simplified problem: Actual problem:
4. Mrs. Horiuchi has a 3394.6 (○) cm. piece of string. Every package she ties uses 154.3 (○) cm of string. How many packages will she be able to tie with this ball of string?	Simplified problem: Actual problem:

Consumer Mathematics

Name_____

How Metricated Are You?

Date_____

Read the "Be a Wise Consumer" section on page 23 of your book.

Look around your house for items that have labels stating the measure in U.S. standard units (e.g., pounds, quarts, inches, etc.) and/or in metric units (e.g., grams, meters, liters, etc.)

Make a list of those items in the table below. Include the measures in both U.S. and metric units whenever possible. If only one type of unit is given, write "None Given" in the other column.

ITEM	U.S. STANDARD UNITS	METRIC UNITS

Consumer Mathematics

Getting There and Back

Name _____

Date _____

1. a. $1 = \frac{\square}{10}$ b. One mile = _____ tenths of a mile.

2. a. $3 = \frac{\square}{10}$ b. Three miles = _____ tenths of a mile.

3. a. $5 = \frac{\square}{10}$ b. Five miles = _____ tenths of a mile.

4. a. $2.3 = \frac{\square}{10}$ b. 2.3 miles = _____ tenths of a mile.

5. To change miles into tenths of a mile, multiply the number of miles by _____.

* * * *

The remainder of this worksheet refers to problems found on page 29 of your book.

Problem 4:

If Sharon buys the tickets individually:

a. How much will it cost her to get to school? _____

b. What is her total cost each day? _____

c. How many days in the school year? _____

d. Her cost for the year = daily cost x # of days
= _____ x _____
= _____

If Sharon buys sets of tickets:

e. How many trips does she make each day? _____

f. How many trips does she make in one school year? _____

g. Therefore, she needs how many sets of tickets? (One set = ____ tickets)
_____

h. Each set costs _____, so Sharon's cost for the year
= cost/set x # of sets
= _____ x _____
= _____

i. Answer question (a) in the book.

j. Answer question (b) in the book.

Problem 5:

a. Herb's car averages _____ miles/gallon of gas. Gas costs _____ a gallon. Therefore, it costs Herb _____¢/mile to drive his car.

b. What is the total number of miles Herb drives to and from school each day? _____

c. Answer question (a) in the book.

d. It costs Herb _____¢ to drive each day. Therefore, the cost per passenger is _____.

e. What other costs are associated with driving a car?

f. Answer question (b) in the book.

Consumer Mathematics

Name _____

Away for the Weekend I

Date _____

If gasoline costs $.67/gal. and you buy 1 gallon, your cost is $.67.

If you buy 2 gallons, total cost = 2 gal. x $.67/gal. = $1.34
If you buy 5 gallons, total cost = 5 gal. x $.67/gal. = $3.35

1. In general: Total cost of gasoline = _____ x _____

Complete the chart:

work space

	# of gallons	price/ gallon	total cost of gasoline
2.	6	$.72	
3.	8.2	$.65	
4.	9		$5.13
5.		$.70	$4.90
6.		$.80	$5.44

If your car has used 6 gallons of gas and it averages 15 m.p.g., you have driven 90 miles. (6 gal. x 15 m.p.g. = 120 mi.)

If you use 8 gal., total distance = 8 gal. x 15 m.p.g. = 120 mi.
If you use 12 gal., total distance = 12 gal. x 15 m.p.g. = 180 mi.

7. In general: Total distance driven = _____ x _____

Complete the chart:

work space

	# of gallons	average # m.p.g.	total distance
8.	7	18	
9.	9.8	14	
10.		13	104 miles
11.	8.1		162 miles

Consumer Mathematics Name _____

Away for the Weekend II Date _____

This worksheet refers to the problem set on pages 32-33 of your book.

Problems 1 and 2:

If the Hoffmans stay in motels

a. Motels cost _____ so their total cost for motels will be _____.

b. How many gallons of gas will they need?

c. What will the total cost of gasoline be?

d. If the Hoffmans stay in motels, the total cost will be _____.

If the Hoffmans rent a motor home

e. They will pay a flat rate of _____ plus an additional _____/mile.

f. What will the total mileage charge be?

g. The total cost of renting a motor home is _____.

h. Answer questions 1 and 2 in the book.

Problem 6:

a. How many gallons of gas will the first motorcycle need?

b. How much will gas cost for this motorcycle?

c. How many gallons of gas will the second motorcycle need?

d. How much will gas cost for the second motorcycle?

e. How many gallons will the car need? How much will it cost?

f. Answer questions (a), (b), and (c) in the book.

Consumer Mathematics

Expenses for Fun

Name_____

Date_____

This worksheet refers to the problem set on page 34 of your book.

Problem 5:

a. How many round trips does Susan make each year to go surfing?

b. Each round trip is _____ miles, so she travels a total of _____ miles to surf each year.

c. How many gallons of gas will Susan need to go surfing each year?

d. Answer the question in the book.

Problem 6:

a. How many pairs of boots will Gail have to buy for hiking for 10 years?

b. Altogether how much will the boots cost her?

c. How many backpacks will she need? What will the total cost of the backpacks be?

d. What is the total cost of boots and backpacks for the 10 year period?

e. Answer questions (a) and (b) in the book.

Consumer Mathematics

That Isn't Exactly Right

Name _____

Date _____

These blank "Guest Checks" are for use with pages 44 - 46 and page 83 in your book.

1. GUEST CHECK

Tax

085001 | P | 1

2. GUEST CHECK

Tax

085002 | G | 2

3. GUEST CHECK

Tax

085003 | M | 3

4. GUEST CHECK

Tax

085004 | M | 1

5. GUEST CHECK

Tax

085005 | R | 1

6. GUEST CHECK

Tax

085006 | G | 1

7. GUEST CHECK

Tax

085007 | G | 3

8. GUEST CHECK

Tax

085008 | G | 1

9. GUEST CHECK

Tax

085009 | G | 3

QUIZZES AND TESTS

Statistics

Quiz 1

Name_____

Date_____

1. Which is a better question, a or b?

   a. Do you like LiAnn's new blouse?

   b. Do you like LiAnn's really great-looking new blouse?

   Why is your choice the better one?

2. Someone asks you the question 'Where were you born?' Is your answer a fact or an opinion?

   _____

3. Write a question which asks for an opinion.

   _____

4. The first thirty numbers of a pattern are given below:

   1, 2, 2, 4, 8, 3, 2, 2, 4, 6, 4, 8, 2, 4, 2, 4, 3, 2, 1, 6, 8, 8, 8, 1, 2, 6, 2, 6, 4, 8, ...

   Complete the frequency table below using the numbers in the pattern:

Number	Tally	Frequency

Table 355. — HOTEL UNITS, EMPLOYMENT, AND PAYROLL: 1967 TO 1977

Year	Number of hotel units[1]			Hotel employment[2]	Payroll[3] ($1,000)
	State total	Oahu	Neighbor islands		
1967	18,235	13,004	5,231	8,944	34,927
1968	21,243	15,138	6,105	10,783	46,730
1969	25,822	18,209	7,613	12,546	58,212
1970	30,323	21,217	9,106	13,613	66,924
1971	35,349	24,612	10,737	15,550	78,222
1972		24,441	11,212	17,619	93,915
1973	37,319	24,969	12,350	18,857	107,525
1974	39,558	25,352	14,206	19,139	115,599
1975	40,691	25,699	14,992	19,885	128,659
1976	44,093	27,099	16,994	(NA)	(NA)
1977	44,986	27,363	17,623	(NA)	(NA)

NA Not available.
[1] December, 1967; November, 1968; October, 1969 to 1976; February, 1977.
[2] Annual averages, for workers covered by the Hawaii Employment Security Law
[3] Wage and salary payments to workers covered by the Hawaii Employment Security Law.
Source: Hawaii Visitors Bureau, *Visitor Plant Inventory* (periodic), *Annual Research Report* (annual), and records; Hawaii State Department of Labor and Industrial Relations, *Employment and Payrolls in Hawaii* (annual).

5. a. How many hotel units were there on the Neighbor Islands in 1974? _____

b. What does the number 12,546 represent on the table?

_____

c. Name one source for this table. _____

d. In what month in 1968 was the number of hotel units determined? _____

e. How much was the hotel payroll in 1969? _____

f. The state total number of hotel units was omitted for 1972. What is the total? _____

g. Which of the following is the most reasonable forecast for the number of hotel units on Oahu in 1978?

a. 20,000 b. 30,000 c. 50,000

BONUS: The rule for the pattern in number 4 has something to do with multiplication. Find the next 10 numbers in the pattern.

Statistics

Name _____

Quiz 2

Date _____

1.

MILK SOLD AT BIG ISLE HIGH SCHOOL ON JANUARY 16, 1979	
SKIM	
REGULAR	
CHOCOLATE	
KEY: = ____ CARTONS	

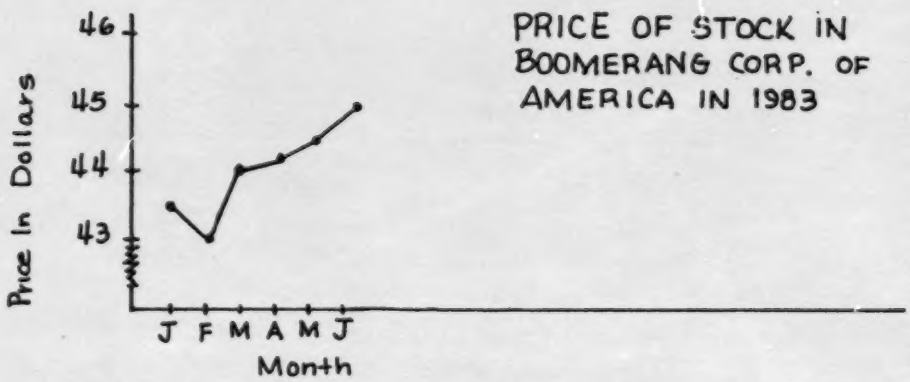
a. Someone forgot to complete the key on this pictograph. If 100 cartons of regular milk were sold on January 16, 1979, the key should read:

= _____ cartons. Fill in the number on the graph.

b. How much chocolate milk was sold that day? _____

c. What was the total amount of milk sold on January 16, 1979? _____

2.



a. How much did the stock cost at the beginning of March? _____

b. At the beginning of how many months did the stock cost more than $44.00? _____

c. During how many months did the price of stock drop from the previous month's price? _____

d. Did the stock cost more in January or December? _____

3. Make a bar graph to display the information in the table below.

LENGTH OF ISLANDS	
Island	Length in Miles
Hawaii	93
Maui	48
Kahoolawe	11
Lanai	18
Molokai	38
Oahu	44
Kauai	33
Niihau	18

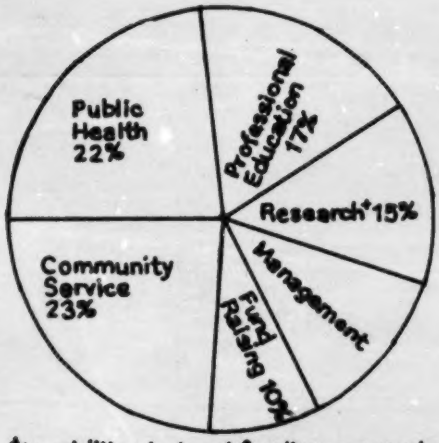
Statistics

Quiz 3

Name _____

Date _____

How the Hawaii Heart Association Invests Money Received



*In addition to local funding, researchers in Hawaii get $38,500 directly from the American Heart Association.

1. Is more money spent on Public Health or Community Service?

_____

2. What percentage of money is spent on management?

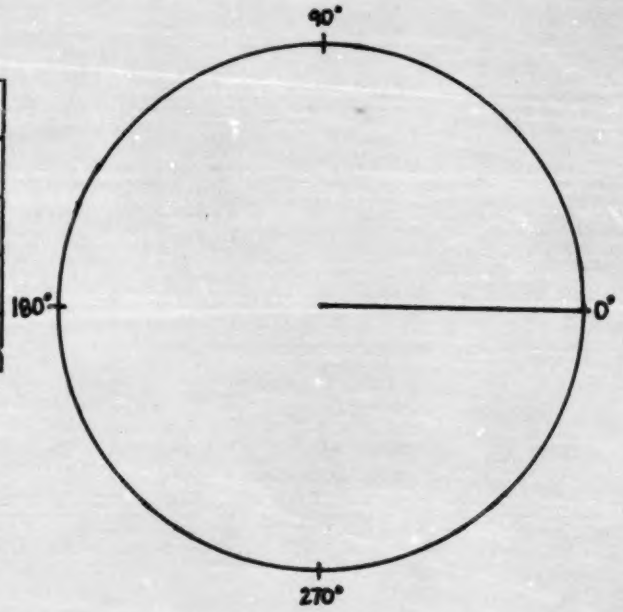
_____

3. If the heart association receives $500,000, how much will be spent on professional education?

4. Complete the following table and make a circle graph to display the data.

Record of a Baseball Player's Hits in One Month

Type of Hit	Number	Part of Total	Measure of Central Angle
Singles	18		
Doubles	9		
Triples	3		
Homeruns	6		



Statistics

Unit Test

Name _____

Date _____

1. Tell whether each of the following is a fact or an opinion:

   a. Statistics is often used in reporting the daily news. _____

   b. Statistics is a hard subject. _____

   c. Statistics deals with collecting and analyzing data. _____

   d. Hawaii is the 50th state in the U.S.A. _____

   e. Hawaii is the most beautiful of the 50 states. _____

2.

TABLE 46. – PUBLIC AND PRIVATE SCHOOLS ENROLLMENT 1966 - 1976

School year	Schools[1]		Enrollment or membership[1]		
	Public	Private	Total	Public	Private
1966-67	210	112	200,242	166,375	33,867
1967-68	215	114	203,734	169,673	
1968-69	217	116	207,231	173,718	33,513
1969-70	216	123	211,213	178,564	32,651
1970-71	216	117	213,165	180,770	32,395
1971-72	219	112	215,524	182,957	32,567
1972-73	222	119	214,360	181,587	32,773
1973-74	225	120	212,012	178,307	33,705
1974-75	225	120	211,702	176,844	34,858
1975-76	225	119	212,171	176,232	35,939
77	227	126	210,841	174,943	35,898

[1] September data for 1972-73 forward; December data for other years. Source: Hawaii State Department of Education, records.

   a. During what year was public school enrollment the highest? _____

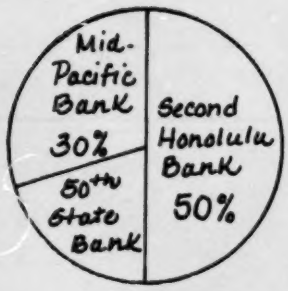
   b. What was the total number of schools in Hawaii in 1976-77? _____

   c. Did total school enrollment increase every year? _____

   d. Between which two school years did the number of public school decrease? _____

   e. What was private school enrollment in 1967-68? _____

3. John Yamamoto owes money to each of three banks as shown below:



a. This type of graph is called

_____.

b. From which bank did Mr. Yamamoto borrow the most? _____

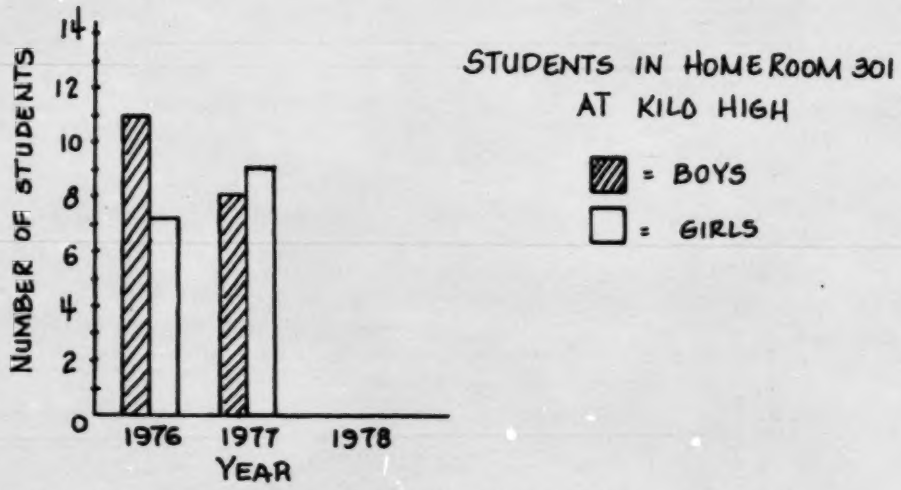
_____

c. What percent of the money was borrowed from the 50th State Bank?

_____

d. If the total debt to the 3 banks is $40,000, how much does he owe Mid-Pacific Bank?

4.



a. This type of graph is called _____.

b. How many boys were in Homeroom 301 in 1976? _____

c. How many student were in the homeroom in 1977? _____

d. In 1978 there were 5 more boys in the homeroom than in 1977. How many boys are in the homeroom? (Show this on the graph.) _____

e. In 1978 there were 10 girls in the homeroom. Show this on the graph.

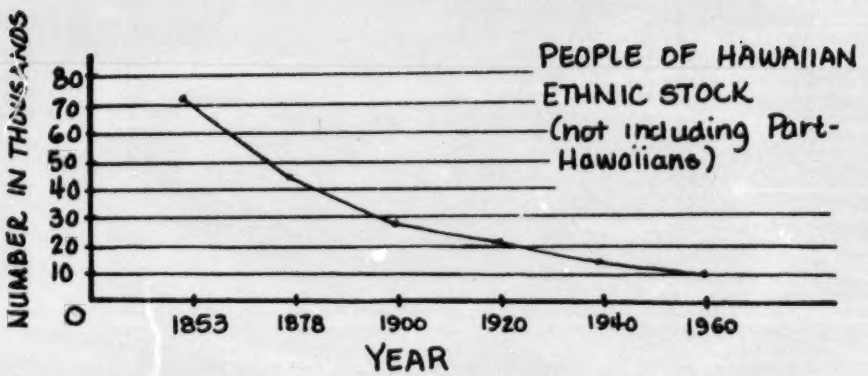
f. How many students were in the homeroom in 1978. _____

5. 36 joggers were asked what their average time is for running one mile. Here are the results (given in minutes):

5	6	10	10	13	8
7	7	6	8	7	10
13	15	11	12	7	9
9	8	9	12	9	10
10	11	10	10	12	11
8	10	8	9	9	6

Make a frequency table to organize this information.

6.



a. How many Hawaiians were there is 1878. _____

b. During what year were there about 21,000 Hawaiians? _____

c. Does this graph include everyone with at least some Hawaiian blood? _____

d. How many more Hawaiians were there in 1853 than in 1960? _____

e. What trend seems to be depicted by this graph? _____

_____

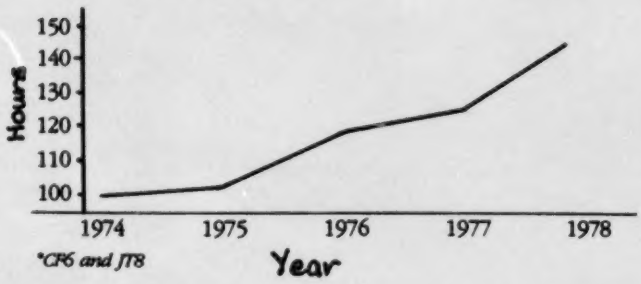
7. a. How many engine "hours of operation" were there in the beginning of 1976?

_____

b. During which year were there 140 engine "hours of operation"?

_____

ENGINE "HOURS OF OPERATION"* FOR MAJOR COOPER AIRMOTIVE AIRLINE CUSTOMERS



*CF6 and JT8

c. Based on information from the graph, how many engine "hours of operation" would you expect in 1979?

Choose one: 140 160 200

d. Is this a good graph or is it misleading?_____

If it is misleading, why?_____

_____

8. Make a graph showing the following information.

PROGRAMMING ON KHAW-TV
Wednesday Evening

Type of Show	Minutes on Air
Comedy	60
Drama	180
Sports	90
News	30

TOTAL 360 min.

Consumer Mathematics Name _____

Quiz 1 Date _____

1. Which is the better buy? 8 oz. potato chips for $1.19

   or 12 oz. potato chips for $1.69?

2. If 12 ounces of chocolate covered Q's cost $1.80, how much will 3 ounces cost?

Use the following menu to answer questions 3 and 4:

LUNCH MENU

Hamburger (6 oz.).....	$ .75	Beverages.....	.30/.40/.50
(8 oz.).....	.95		
Cheeseburger (6 oz.)....	.85	Lunch Plates	
(8 oz.)....	1.05	1. Hamburger (6 oz.), fries or potato salad or cole slaw, small beverage...	1.45
French Fries.....	.40		
Potato Salad	.45		
Cole Slaw	.35		
		2. Same as above, except cheeseburger.....	1.55

3. What is the least expensive price when ordering two hamburgers (8 oz. size), french fries, and a large cola?

4. Is it less expensive to order a 6 oz. cheeseburger, cole slaw, and a small root beer à la carte or as a lunch plate?

5. A recipe Maina is using calls for 1 large onion. Three pounds of onions cost $1.08 and there are 2 large onions in one pound. How much will the onion for Maina's recipe cost?

Consumer Mathematics

Name _____

Chapter 1 Test

Date _____

1. Four ounces of Maxim Freeze Dried Coffee sells for $2.89. The eight ounce jar of Maxim sells for $5.15.

   a. What is the unit price for the 4 oz. jar? (How much does one oz. cost?)

   b. What is the unit price for the 8 oz. jar?

   c. Which is the better buy?

2. Which is the better buy: a 50 ml tube of toothpaste for $.65 or a 150 ml. tube for $1.80 ?

3.

HARPO'S

Luncheon Special (2 slices of pepperoni pizza, a tossed green salad and a medium drink)	*2.60*
Mini Special (A slice of pepperoni pizza, a tossed green salad and a medium drink)	*1.85*
Tossed Green Salad	*.80*
Pepperoni Pizza (by the slice)	*.90*
Drinks	*.20/.30/.40*

The Luncheon Special at Harpo's costs $2.60.

a. How much would the same items cost if ordered à la carte?

b. How much money would you save by ordering the luncheon special?

4. The Sakai's earn $12,000 a year and spend 23% of this income on food.

   a. How much money will they spend on food this year?

   b. How much will they spend on food each month?

5. Paper towels are on sale: 3 rolls for $2.40. How much will it cost to buy five rolls?

6. A six pack of Coca-Cola costs $1.38 and each can contains 12 oz. of coke.

   a. What is the cost of one can?

   b. What is the cost of one ounce?

7. Instead of buying a hot fudge sundae at the snack bar, Sharen has decided to make her own. A carton of ice cream (which will make 4 sundaes) costs $1.40 and a container of hot fudge (enough for six sundaes) costs $1.20.

   a. How much will it cost Sharen for one sundae?

   b. A sundae at the University snack bar costs 75¢. How much money will Sharen save by making her own sundae?

   c. What are some of the hidden costs in this problem? (Name at least 2.)

Consumer Mathematics

Name_____

Quiz 2

Date_____

Work must be shown for partial credit.

1. A taxi charges an 80¢ base fee plus 7¢ for each tenth of a mile traveled. How much would you be charged for a 4 mile ride?

2. Mr. Wong takes the subway to and from work. He works 240 days a year. Each ride on the subway costs 25¢. How much will Mr. Wong spend on transportation for work this year?

3. How much will it cost to drive 150 miles if your car gets 15 m.p.g. and gas costs $.70 per gallon?

4. Eseta is going to work at 'Todd's Place', a new fast food restaurant. She will work four hours a day, three days a week. She is paid $2.75 per hour.

   a. How much will Eseta earn each week?

   b. Eseta must take the bus to and from work. If the bus costs 25¢ each way, what will her net earnings be each week?

5. Dave and John are visiting friends on the mainland. The two of them are going to take a short trip this weekend. A round trip bus ticket costs $15. If they borrow their friends' car, they will have to buy 35 gallons of gas at $.70 per gallon and pay $4 in tolls. Which is the less expensive way to travel? How much less expensive is it?

Bonus: A 3.8 mile taxi ride costs $2.65. The base fee is 75¢. How much is the mileage charge (for each 1/10th of a mile)?

Consumer Mathematics

Name _____

Quiz 3

Date _____

Work must be shown for partial credit.

1. Change the following %'s to decimals:

   a) 7% = _____ b) 38% = _____ c) 4½ % = _____

2.

Amt. of Sale	Tax (5%)
$.00 - .10	-----
.11 - .29	$ .01
.30 - .50	.02
.51 - .69	.03
.70 - .89	.04
.90 - 1.10	.05

Use the table at left to find 5 % sales tax on a purchase of:

a) $ .67 tax = _____

b) $3.18 tax = _____

3. Obe bought a new pair of jeans for $14.20. If the sales tax is 4%, what was his total bill?

4. Evans bought groceries totalling $10.32. If he gives Hans (the cashier) a $20 bill, what coins and bills should Evans receive as change? (Use the fewest number of coins and bills possible.)

5. Mary bought some things at the drugstore. Estimate her cost to the next higher $ .10. Then estimate a 4% sales tax on her estimated total.

Item Price	Estimate	Running Total
$ .43		
1.37		
3.92		
.61		
	(tax)	

Consumer Mathematics

Name _____

Date _____

Unit Test

Work must be shown for partial credit.

1. Which is the better buy: 12 oz. of catsup for 60¢ or 20 oz. for $.87?

2. Fred's car gets 15 m.p.g. of gasoline. If gas costs 58¢ per gallon and Fred intends to drive 300 miles this week, how much will he have to spend on gasoline?

3. The Jefferson's have an annual income of $9800. They spend 27% of their income on food.

   a. How much do they spend on food in a year?

   b. How much do they spend on food each month?

Use the menu below to answer questions 4 & 5:

MEXIHUT MENU:

taco	.50	Taco Plate (includes 2 tacos)	1.75
tostada	.95		
enchilada	1.25	Enchilada Plate	1.95
burrito	.99	Burrito Plate	1.95
beans	.40		
Spanish rice	.40	Beverages:	.30/.37/.45

All dinner plates served with beans and Spanish rice.

4. The Taco Plate costs $1.75.

   a. How much would the same items cost if ordered à la carte?

   b. How much money do you save by ordering the Plate?

5. Using the Mexihut Menu, complete the following guest check:

GUESTCHECK			
1	Taco Plate		
2	Burrito		
1	Sp. rice		
2	Med. Cola		
1	Lg. Cola		
thank you for eating here!	Sub-total		
	4% tax		
	Total		

6. Annette is going to work at the Kona Theatre for the summer. She will work 8 hours a day, 5 days a week for 8 weeks and will earn $2.90 per hour.

   a. How much will she earn this summer?

   b. She rents a uniform each week for $4 and spends 50¢ a day on bus fare. What are Annette's total expenses?

7. Bread is on sale: 3 one-pound loaves for 89¢. How much would you pay for 2 loaves?

8. Someone purchases items worth $13.61 and uses a $20 bill to pay for them. Which coins and bills, and how many or each, would you use to make change? (Use the fewest number of coins and bills possible.)

9. Sales tax in Hawaii is 4%. How much sales tax would you pay if you bought a used car for $850?

10. To rent a bus for a weekend trip costs $180. Three buses are going to be rented. Two buses hold 60 students, 1 bus holds 80 students. If the students want to share the expenses equally, how much should each one pay?